A STUDY ON VADHA KARSANAM

(PERIPHERAL NEURITIS)

DISSERTATION

Submitted to

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BRANCH I – MARUTHUVAM

POST GRADUATE DEPARTMENT OF MARUTHUVAM
GOVERNMENT SIDDHA MEDICAL COLLEGE,
ARUMBAKKAM, CHENNAI – 600 106

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CONTENTS

CERTIFICATE

Certified that I have gone through the dissertation submitted by **Dr.S.DURGHADEVI** a student of final M.D(S), Branch-I Maruthuvam, Government Siddha Medical College, Chennai and the dissertation work has been carried out by individual only.

Place: Chennai

Date:

Professor & Head of the Department
Post Graduate Department
Branch-I Maruthuvam
Govt.Siddha Medical College
Chennai.

F¡»yhÂ Nuz«

R¡F

äsF

Â¥Ãè

fL¡fhŒ

bešèt‰wš

jh‹¿¡fhŒ

Óuf«

gu§»¥ g£il

F¡FY

F¡»yhA Nuz«

bt£ont® ijy«

fL¡fhŒ

f°öç kŠrŸ

mÂkJu«

bt£o nt®

Â¥Ãè nt®

bt£ont® ijy«

VADHAKARSANAM - PERIPHERAL NEURITIS

INTRODUCTION:

The Science of medicine is of fundamental importance to one's well being and his survival and so it must have originated with man and developed gradually as civilization advanced.

The Siddha system of medicine has derived its name from the word "Siddha" which means attainment of perfection of "Eternally Bliss". The Siddha system of medicine which "The Gift of nature" which was originated from Lord Shiva and was gifted to Tamilians by people called Siddhars. Siddhars are people who are not only physicians, they are social reformers.

"kW¥gJlš nehŒ kUªbjd yhF«
kW¥gJs nehŒ kUªbjdš rhY«
kW¥gÂå nehŒ thuhÂ U¡f
kW¥gJ rhit kUªbjd yhnk"

So perfect health leads to a perfect mind which ultimately leads an individual to Salvation or "Veedu Peru"

Besides treatment by medicine Siddhars work in tamil on alchemy, kayakalpa & Yoga are considered to be more valuable.

According to Siddha Medical Science the universe originally consisted of atoms which contributed to five basic elements viz earth, water, fire, air and either which corresponded to the five senses of the human body and they were the fundamental of all things in the world.

“m©l¤ÂYŸsnj Ã©l«
Ã©l¤ÂYŸsnj m©l«
m©lK« Ã©lK« x‹nw
m¿ªJ jh‹ gh®¡F« nghnj”

- r£lKå Phd«

From the above mentioned lines even a minor changes in the atoms of the universe immediately affect the human body. A close relationship is found to exist between the external world and internal system of man Siddhars maintain the structure of the human body is a miniature world in itself.

Siddha Pathology explains the three humours namely Vadham, Pitham Kapham to maintain the upkeep of human body.

The normal Order of Vadham, Pitham and Kapham is in the proportion of 1:½:¼. The normal degree of the pulse is also to be respectively maintained in the same ratio.

The maintenance of the normal order ensures the prevention of health and humours normal functioning of human body. Any change in the proportion of the three humours is such to bring according to the derangement.

The disease are classified on the basis of Vadha, Pitha, Kapha on the basis of Vital organs or systems affected into 4448 types. Of which Vadha disease are classified into 85 types by Yugi Muni.

One such type is Vadha Karsanam. The disease may be correlated in the Peripheral Polyneuropathy in allopathic view.

The unshakable belief among the people regarding the Vadha disease is that it can be effectively managed only by Siddha Medicine than other systems of medicine also initiates me to choose for my dissertation work.

The comparative study with other systems of medicine and an analysis based on the results of these studies would help us to find out the individuality of Siddha System of Medicine. The modern studies along with siddha system of medicine bring us to light the high level of medical knowledge. Similar studies on Siddha system will reveal many of the forgotten fundamentals, the proper appreciation and development will make this system to grow into a magnificent dimension.

* * * * * *

AIM AND OBJECTIVES

The aim of this study is to evaluate the efficiency of the Siddha Medicine in the management of Vadha Karsanam.

Vadha Karsanam may be correlated to peripheral polyneuropathy which involves especially the peripheral nervous system of body.

The Onset in more frequent above the 5^{th} decade of life. This mainly affect the patients general health and marked sensory impairment has been noted Siddha medicines are mostly part of natural and processed in such a way as to be readily absorbed with in each cell in the body giving it proper nourishment to sustain long and healthy life.

Many chronic diseases considered incurable in other medical system can be treated successfully with Siddha Medicine. A extensive study of literatures and guidance of academician inspired me to research in this topic.

The Main Objectives are :

- To carry out a clinical trial on Vadha Karsanam patients with medicines in the G.S.M.C. under the Post Graduate Department of pothu maruthuvam attached to Arignar Anna Hospital of Indian Medicine, Chennai.
- To collect various Siddha literature and make detailed study about the ideas mentioned in Siddha concept based on literature.
- To study Vadhakarsanam in various literatures in comparison with modern science.

- To understand the incidence of disease with reference to age, thinaigal paruvakaalam, Socio – economic condition, diet and family history.
- To explore the unique diagnostic methods mentioned by siddhars.
- To use Siddha and modern parameter to confirm diagnosis, severity and progress of the disease.
- To evaluate the biochemical & microbiological features of the drug.
- To know about the pharmacological activity of trial drug.
- To insist Yoga and Physiotherapy along with medicines for attaining good results.
- The results and observation are recorded and illustrates with necessary tables as graph.

The choice of drugs for clinical trial were,

- Kukilathy Choornam [Internally].
- Vetiver thylum [Externally].

* * * * * *

REVIEW OF LITERATURE

SIDDHA ASPECTS :

According to Yugi Vaidhya Chindhamani :

"v‹dnt thj bk‹g jhF«
Ïf¤Âny kåj®fS¡ bfŒÍ khW
Ã‹dnt bg©jida nrhuP brŒJ
bgçnah®fŸ Ãuhkziu¤ ölâ¤J«
t‹dnjt¢ brh¤Âš nrhuŠ brŒJ
khjhÃjh Jutk wªj ng®¡F«
f‹dnt ntj¤ij ãªij brŒjhš
fha¤Â‰ fyªÂLnk thjª jhnd
g¡f« 183
jhbd‹w fr¥nghL Jt®¥ò iw¥ò
rhjfkhŒ äŠR»YŠ rik¤j t©z«
Mbd‹w th¿dJ bghÁ¤j yhY«
Mfha njwyJ Fo¤j yhY«
ghbd‹w gfYw¡f äuh éê¥ò
g£oåna äfÎWjš ghu bkŒjš
njbd‹w bkhêah® nk‰Áª ijahjš
Ó¡»ukhŒ thjkJ brå¡Fª jhnd
ghlš 244 g¡f« 183
Md‹ tu‹widna kÂah khªjh
mfÂ gunjÁah f£f‹d Ûah®
nfhdhd FUbkhêia kwªj ng®fŸ
bfhiy fsÎ bghŒfhk§ F¿¤j ngh¡F
Cid rlªj‹åš thj« tªJ
c‰gé¡F« ntj¤Â‹ c©ikjhnd
ghlš 254 g¡f« 183

AETIOLOGY OF VADHA DISEASES:

- Breech of Trust

- Abusing the elderly people and priests
- Exploitation of Charitable properties
- Ingratitude with father, mother & teachers
- Excessive consumption of bitter, astringent and pungent taste food.
- Intake of hot rice or rancid foods.
- Drinking rain water directly.
- Sleeping during day and awakening during night.
- Starvation.
- Lighting or carrying of heavy loads
- Excessive lust
- Refusing food for destitute and hermits.
- Disregarding the advice of preceptors.
- Involving in murdering, stealing, lying and lustful activities.

According to Agasthiyar Gunavagadam

bjhšiy brŒa Ï‹D« btF thjnehŒfŸ
bjhšY»š khªjU¡F fh©gJ©L
všiyæšyh thjnehŒfŸ ne®ik j‹ik
Ïašghf m¿ªÂlnt égu§nfns

étuklh mrÂr‹å _is nehÎ
éçthd _isaJ äUJth»
mtåjåš Âlkhf¥ nghtjhY«
m¥gnd _¤Âu¡ F©o¡fhŒ éahÂahY«
jtKåt® Ô®fh§if nkfnuhf«
j‹ikÍŸs K¤j©L¡ bfho éahÂ
mtäyh¥ gçr eu«gK¤j§ f©lhŒ
mQFklh thjnehŒ MF« ghnu.

mQFklh khär¤Â‹ éahÂahY«
m¥gnd Njf¤Â‹ bgU¡fhY«

Fzäšyh Ïur« t§f« Â‹dhY«

FobfL¤j thjkJ c©lhk¥gh

- g¡f« 16

- Brain disease
- Kidney disorders
- Sexually transmitted disease
- Disease of the vertebral column and spinal cord
- Menorrhagia
- Taking improperly prepared medicines of mercury and lead will cause Vadha disease

According to pararasa Sekaram

bjhêš bgUif¥ò fh®¤jš Jt®¤jš éŠR»QŠ nrhW«
giHajh« tuF k‰iwa igªÂiz aUªÂdhY«
vê¥ bgw¥ gfYw§ Ïuéå Yw§fhj jhY«
kiHãf® FHèdhns thjªnfh Ã¡F« fhnz

- g¡f« 12

- Consumption of excessive bitter taste
- Astringent
- Cereals
- Savories
- Rancid food
- Day time sleep
- Lacking night sleep vitiates Vadham

According to Therayar Vagadam

thÍ nfhÃ¤jhš rªJ misªJ jiynehth«
ä¡fK®¢ir bfh£lhé é£lJ bfça ky§f£L«

X¡feu«ò jh‹ Kl§f _yk$J thŒ Ú¿LtU«

ä¡f FëU« eL¡fkh« nkå F‹¿ éL§fhnd -g¡f« 76

- Vitiation causes pain in the joint
- Headache
- Excessive yawning
- Burning sensation of the body
- Constipation
- Paralysis
- Excessive salivation
- Chillness or tremor

According to Theran Magakarisal

Mf§ fW¡F neh ahf¤Jo¡F«

Mwh¤Ô ba‹dbkŒ naf§ bfhÂ¡F«

MubkŒ éa®Âæ® Ûj$j« thŒ_¢R

MFnkŒJ thj nkæ‹

- g¡f« 15

Vitiation of Vadha causes

- Discoloration of normal skin
- Burning sensation over body
- Sweating
- Numbness
- Dyspnoea

According to Agathiyar Kanmakandam 300

üby‹w thj« t$jtif jhndJ

E©ikahŒ¡ f‹k¤Â‹ tifia nfS

fhèna njh‹¿aJ fL¥g njJ

iffhèna Kl§»aJ Å¡fnkJ

nfhèny gL¡»‹w éU£rkhd

FH$ij ku$jid bt£lš nkš njhš Ótš

ehëny Ótbr$J fhš K¿¤jš

ešy bfh«ò jiHK¿¤jš eè¤jš jhnd

- g¡f« 13

Unavoidable consequence of good or evil acts done in this or in a past existence such as

- Removing the bark of living trees
- Breaking the legs of the animals
- Cutting the trees and the living branches removing leaves
- Leads to causalgia, Paralysis of the upper lower limb and oedema.

According to Agasthiyar Gunavagadam

m«òéæš thjnehŒ tUF« ne®ik
m¥gnd brhšY»nw d¿thŒ¡ nfS
bj«òlnd Xçl¤Â nyD k¥gh

r«ÃukhŒ¥ gçr eu«Ã nyD
rÂuhd rtd eu«Ã nyD k¥gh
f«Ãjah au©L kšyhk‰ nghdhš
fojhd °j«gdnuhf bk‹w brhšth

- ghlš 121 g¡f« 31

- Vadha disease may occur in a single or many places.
- Vadham may involve sensory, motor nerve or both

According to Therayar Sekarappa :

Ãå a£ltiz br¥ò nt‹ fU¥bghUë
KJnkfbaç nuhf§ thj nuhf«

- g¡f« 45

According to Kannusamyam

nkf¤Âš ÚçêÎ nkÎkÂš thjnehŒ

- ghlš 59 g¡f« 18

In megarogam, Madhumegam may couple with Vadha Noi

According to Yugi Vaidhya Chindhamani

Twhd nkfkJ ÏUg J¡F«
Fz^{a}jid Át‹brhšy njé nf£f
jhwhd jhfbkhL
mo¡fo¡F¤ j©Ù® -

jh d‹d§ nf£lš blçÎ© lhnk

vçnthL rßubkšyh kiwg£ lh‰nghš

vêYl«ò nehjš

bjçnthL njfbk§F« btSU© lhjš

njfbk¤j thbyh¥g gLjš fhnz

- ghlš 484, 485 g¡f« 186

- Excessive Thirst
- Burning Sensation
- Pallor

According to Anubava Vaidhya Devaragasyam, Neerizhivu avathai quotes

1st - Heaviness of the body

2nd - Dried, Pale skin

3rd - Parched tongue

4th - Burning Sensation

Page 134

According to Maan murugeeyam

bk‹nwš nkå btëwš bkèjš

tèikæH¤jš Rit bflš js®¢Á

cæ®¥ò FWfš vD«Ïit bašyh«

FUÂ¡ Fiwæ‹ bghJ¡ F¿¥bg‹g

KJF j©o‹ eu«òfŸ jh¡Fjš

if, fhš F¤jš Âä®jš ÃwÎ«

bfhoa FUÂ¡ Fiwéid¤ÂLnk

ghlš 3383 g¡f« - 84-85

- Pallor of the skin.
- Loss of body weight.
- Fatiguability.
- Loss of taste sensation.
- Involvement of spinal nerves.
- Pricking sensation, numbness in extremities.

PREMONITORY SYMPTOMS OF VADHA DISEASES:

- Numbness.
- Nervousness.
- Crepitation.
- Aching & Pricking sensation.
- Blackish discoloration of skin, mucous membrane and stools.
- Atropy of organs.
- Stabbing pain.
- Tremors.
- Dryness of skin and mucous membrane.
- Dislocation of joints.
- Emaciation.
- Difficulty in movement of limbs.
- Thirst.
- Spasticity.

* * * * * *

VADHAKARSANAM

Vadhakarsanam is one of the Vadha disease involving both legs. This disease is characterized by, Numbness, Weakness of the body, pain in the legs, inability to walk, pricking sensation. It refers to causalgia due to peripheral polyneuropathy.

IN YUGI VAIDHYA CHINTHAMANI

VADHA KARSANAM QUOTES

gh®¡»‹w thjÎŸ soæ‰ rhâ
gÂ¤Jit¤ jJnghy¤ njf bk§F«
neh¡»‹w FÂiu«ò¡ fhšf bs§F«
bfhojhd ghukhŒ¤ Âä®¥ ò©lh»
th®¡»‹w th®¤ijfŸ äfnt brŒJ
tisªÂoD« ãä®ªÂoD« tr§bfhlhkš
V®¡»‹w fhYis¡F« thj f®rd«
<jyw äšyhjh®¡ bfŒJ§ fhnd.

And also according to T.V.Sambasivam pillai - Quotes

1. Numbness present in both soles.
2. Numbness all over the body
3. Pain in the legs.
4. Heaviness all over the body
5. Inability to bend or stretch the body due to heaviness.
6. Difficulty in walking.
7. Pricking sensation of the soles

- **PARARASASEKARAM**

According to Pararasasekaram the disease Erivadham closely resembles Vadhakarsanam.

éçéå èu©L fhY« äF¤jÎŸ soÍbehªnj
vçæåš it¤jh¥ nghny baY«òw Îy®¤Âa§f«
òiujå‰ òG¡f q®jš nghynt eilbfh lhjš
fUÂU bkçth j¤Â‰ f©oU Fz§f shnk

- ghlš 238 g¡f« 60

cŸso Âä®¤J¡ F¤Â Íis¤ÂL bkçªJ nehF«
jŸëL eilbfh lhJ jh‹äf tèÍ© lhF«
m‹åiy ntiy¢ nriy gl®ªÂL« éçä‹ dhns
cŸso thjŠ brŒÍ§ Fzäit Íiu¡F§ fhny.

- ❖ Tingling, Pricking pain.
- ❖ Burning Sensation.
- ❖ Numbness over both soles.
- ❖ Difficulty in walking.

According to **Pararasasekaram** the **Poruthu Vadham** quotes.

Mdfhš ifÍª r¤J k§‡nd ku¤J¢ rhâ
jhDw¥ óÁdh¥ngh‰ rLÂæš éUé U¤nj
CDs ifÍ§ fhY K£ozkh§ fÁªj jh»š
MdJ bghU¤J thj khfnk eilbfh lhJ.

- ghlš 242 g¡f« 61

- ❖ Dung coated Sensation Over extremities.
- ❖ Burning sensation over limbs.

According to Pararasasekaram Ullangal Vadham Quotes:

cŸso Âä®¤J¡ F¤Â Íis¤ÂL bkçªJ nehF«
jŸëL eilbfh lhJjh‹äf tèÍ© lhF«
mŸëiy ntiy¢ nriy gl®ªÂL« éêä‹dhns
cŸso thjŠ brŒÍ§ Fzäit Íiu¡F§fhny

- ghlš 184 g¡f« 50

- ❖ Tingling, Pricking pain.
- ❖ Burning Sensation.
- ❖ Numbness over both soles.
- ❖ Difficulty in walking.

According to **Siddha Maruthuvam**, **Kaikalerithal Quotes**.

It is due to exacerbation of Vadha and a reactive phenomena of pitha and kapha exacerbation, affecting both palms and soles producing burning sensation.

It is seen in women after pregnancy and also in madhumegam.

- **Dhanvantri Vaidhyam**

According to Dhanvantri Vaidhyam – Padha Erivu Quotes

elªÂL»š eu«ò tè¤ ÂLÛj‹¿
Â© bgWŸ s§fhš ef¡f© òw§fhbyš yhª
Ôbadnt vçªJisªJ tè¡Fkh»
byh‹ FiHna æitghj baçth bk‹nw
Í«g® òfœ F«gKå Íiu¤j thnw

- ghlš 5 g¡f« 38

- Neuralgia.
- Burning Sensation over soles, lateral sides of legs and in tip of the fingers.
- Gnawing pain.

The disease Vadha Karsanam the disease also resembles with Karas thambavadham.

According to **Madhavanidhana**, **Padha daha** quotes.

Numbness, burning of the feet (Pada-daha) is a variety of vadha disorder is a peculiar disease.

Air, bile & blood accumulated in the feet produces numbness and a burning sensation, particularly when the person is walking.

- Page 94.

jŠrhñ® ru°tÂ kfhš üš ãiya«

ghjh®rthj¡ F¿fŸ:

brašbgU Ány‰g« thj« cŸs§» tjåš nr®ªJ
ga« tu¡ TÁ¡fÁ¥ g¤Âa‰Wz®¢Áæ‹¿
RaFz§ bf£L¡fhiy¢ NœªJÑ Dªnjh‹ whnj

æašbgU kh»‰ghjh çthj bk‹dyhnk

thjK« fgK« cŸs§fhšfis¥ g‰¿ el¡ifæš gaK« T£rrK« c©lhF«. cz®¢Áæ‹¿ fhèš kjkj¥ò V‰gL«. f¤Âædhš Ñ¿dhY« bjçahJ. Ïit ghjh®rthj¡ F¿fshF«.

ghjjhf¡ F¿fŸ:

Ã¤j¤nyD k‰w¥ bgU»a éu¤j¤njD
e¤ÂathÍ¢ nr®ªJ jHbyd baçÎ fhD«
F¤ÂuŠ bra¡injh‹W¡ FKwš Fz§fsh»
é¤ij Ô ghjjhf thjbk‹ ãiu¡fyhnk
Ã¤j« mšyJ Ïu¤j« ÏitfSl‹ thÍ
nr®¤J, fhš fis¥g‰¿¤ jh§fKoahj
vç¢riyÍ©lh¡F«. el¡f KoahJ. g¡f« 33

* * * * * *

1. **DEFINITION:**

Vali is one of three humour [Vali, Azhal & Iyam] and it consists of Vayu [Air] and Akash [sky] the two basic constituents of "Fire elements" i.e., Panchabootham. The first phase in human life is attributed to Vali, the middle to Azhal and the last phase to Iyam.

"thjkhŒ gil¤J Ã¤j t‹åahŒ fh¤J
nr¤k ÓjkhŒ Jil¤J
- njiua® kU¤Jt ghuj«

Vali is more potent and important than others is held responsible for the movements of various parts of our body. When the three humours are in equilibrium, they are called thathus and while they are deranged they are called as kutras or dhosas.

In physiological conditions the existence of three thathu are in the ratio 1:1/2 : ¼ respectively. The ratio is altered when there is disturbance of normally existing thathus by the environmental factors, diet habits etc and Vadha dhosam may be increased or decreased.

2. LOCATION OF VALI:

Seats of Vali: Below the naval, Generally Vadham lies in

1. Urinary Bladder.
2. Intestine .
3. Umblical Cord.
4. Lower Abdomen.
5. Pelvis.
6. Bones.
7. Muscles.
8. Nerves.
9. Joints.
10. Skin.
11. Hair Follicles.

3. RELATION WITH TASTE:

The tastes which increase Vadham are sour and astringent.

"òëJt® éŠR« f¿ahš óç¡F« thj«
xëct® if¥ng¿š Ã¤j« ÓW« - »ëbkhêna
fh®¥ò ïå¥ò éŠÁš fg« éŠR« - r£ouj¢
nru¥ òz® nehŒ mQfhnj"

- nehŒ ehlš ghf« - 1

Sweet, Sour, Salt tastes Neutralise Vadham

"thj nkè£lhš kJu« òëÍ¥ò

nrjKw¢ brŒÍŠ Áiwa« - Xj¡nfŸ
fhuª Jt®fr¥ò fh£LŠ Ritbašyh«
rhu¥ gçfhu« rh‰W”

4. **RELATION WITH FIVE ELEMENTS:**

Vadham = Vali + Aahaayam

Vadham has vali and aahayam as its elemental constituents. If vali and aahayam or any of them is decreased or increased from the normal level, it will surely lead to Pathological state of Vadha disease.

Regarding diet, bitter, pungent and astringent tastes contain Vali and bitter alone contains aahayam. So if these are consumed in large amounts this results in the vitiation of vadham and eventually vadha diseases. The six tastes and their constituent elements are as follow

Sweet	=	Earth + Water
Sour	=	Earth + Fire
Salt	=	Water + Fire
Bitter	=	Air + Sky
Pungent	=	Air + Fire
Astringent	=	Earth + Air

5. **NATURAL PROPERTIES OF VALI**

1. Giving briskness.
2. Respiration.
3. Functioning the mind, thoughts and body.
4. Regulation of the fourteen Visceral reflexes.
5. Functioning the seven physical constituents.
6. Protection and strengthening of the five sensory organs.

6. **QUALITIES OF VALI :**

Own Qualities

1.	Kadinam	-	Hardness.
2.	Varatchi	-	Dryness.
3.	Lesu	-	Lightness.
4.	Kulirchi	-	Coolness.
5.	Asaidhal	-	Mobility.
6.	Anuthuvam	-	Subtleness.

7. VARIETIES OF VALI :

The Siddha classical texts divide the general principles of vali into ten subsidiary forms that differ from one another by their localization in the body and by their particular functions. They are

1. Pranan [Uyir Kaal]

It corresponds to the cardiac plexus and refers to the chest. It regulates the respiratory system and helps the digestive system. Its derangement causes respiratory disorders.

2. Abanan [Kizhnokkukaal]

It corresponds to the pelvic plexus and expels faecal matter and urine. It constricts the anal sphincter. It helps to spread the digestive food all over the body. It is also responsible for expulsion of sperm and menstrual flow. Its derangement leads to diseases of the bladder, rectum and reproductive system.

3. Vyanan

If corresponds to the vaso – ciliary at the root of the nose and base of the skull. Vyanan spreads all over the body in all nerve endings and causes constrictions and relaxation of both voluntary and involuntary muscles. This is responsible for the movements of the body and for sensory perceptions.

It causes flow of fluids, flow of sweat, opening and closing of the eyes etc., It is responsible for taking the absorbed essence of the

food to the different parts of the body. The neurological problems of the body are basically because of the derangement of Vyanan.

4. Udhanan [Melnokukal]

It corresponds to the pharyngeal plexus in the throat region and regulates the higher functions of brain like speech. Its derangement causes symptoms of upper gastro intestinal disorders. It is also responsible for the physiological reflex action like vomiting, hiccup, cough, sneezing etc.

5. Samanan [Nadukkal]

It corresponds to the Solar plexus in the naval region and controls digestion. Its acts as a neutralizing air for the upward and downward air [abana & udhana]. Its derangement will cause gastrointestinal symptoms and neurological respiratory symptoms as this Vayu is the neutralising force for the other four vayus.

6. Nagan

Nagan is responsible for the intelligence of an individual. This is responsible for vision. Lacrimal secretion is also attributed. It causes opening and closing of eyelids. Its derangement causes impaired memory & lack of coherent thinking.

7. Koorman

This causes yawning and closure of eyelids. This is responsible for vision. Lacrimal secretion is also attributed to koorman. It gives energy to the body and helps in body building.

8. Kirugaran :

This lies in the tongue, salivary secretion nasal secretion, hunger, concentration of the mind on one particular thing, sneezing, cough are all attributed to kirugaran.

9. Devadhathan :

Laziness is attributed to this Vayu. This ocular movements, human passions like anger are attributed to this Vayu.

10. Thananjayan :

It produces swelling all over the body and leaves from the body by blowing of the cranium only on the third day after death. This is responsible for decay of the body after death.

8. TEMPERAMENT OF VALI PERSON:

Physical & Psycological features of Vali Person

Persons with Vadha temperament will have an increased Vadha while pitha and kapha may be normal. They are all with strong thighs, crepitation in the joints, swollen eyelids, round eyes, fixed with muddy conjuctiva, a blackish skin colour, hair shafts are split, clarity in speech, occasional slurred speech, desire for sweet, sour, salt and hot food, aversion towards cool food, excessive appetite with decreased physical ability. Attraction towards other sex will be sub-normal and they have a good desire in sports and games, music and hunting while not having proper sleep.

9. THE FEATURES OF AGGRESSION OF VALI

1. Body weakness and darkness.
2. Liking to eat hot foods.
3. Shivering.
4. Abdominal distension.
5. Constipation.
6. Diminution of immunity.
7. Giddiness.
8. Insomnia.
9. Laziness.
10. Body ache.

11. Pricking Pain.
12. Nerve Weakness
13. Muscle Wasting
14. Weakness of limbs
15. Paralysis of the limb
16. Polydypsia
17. Excessive sweating
18. Thirst

10. THE FEATURES OF DEPRESSION OF VALI

1. Stiffness
2. Diminution of Voice
3. Impaired intellectual function
4. Semi – consciousness
5. Difficulty in doing any kind of work
6. Paleness and coolness of body
7. Excessive salivation
8. Anorexia
9. Heaviness of body
10. Breathlessness, cough, excessive sleep and abdominal distension

11. ALTERNATIONS OF VALI

Vali is vitiated physiologically in Aadi, Purattassi and Iyppasi

Pathologically, the three humors are affected either by themselves or with Udal Thaadukkal.

The type of alterations of Vadham are

a. Thannilai Valarchi :

Definition : A kutram is provoked in its own locations is called “Thannilai Valarchi”

Limitation : Hatefulness of the things which are causing Thannilai Valarchi and likeness of the things

which are getting opposite properties are the limitations of Thannilai Valarchi.

Duration : Vali gets Thannilai Valarchi during Mudhuvenir Kaalam [Aani and Aadi]

b. Vetrunilai Valarchi :

Definition : A kutram which is provoked to the other locations is called "Vetrunilai Valarchi"

Provocation : Signs and Symptoms of the affected kutram and the Pathological conditions of the udal Thaadukkal give the details of the limitations.

Duration : Vali gets Vetrunilai Valarchi during Kaar kaalam [Aavani and Purattasi]

c. Thannilai Adaidhal :

Definition : A provoked kutram, which is neutralizing in its own property is called Thannilai Adaithal.

Duration : The provoked Vali neutralizes during koothir kaalam [Iyppasi and Kaarthigai]

Factors which alter Vali :

1. When hot is mixed with Vali, Vali gets Thannilai Valarchi.
2. When cold is mixed with Vali, Vali gets Vetrunilai Valarchi.
3. When hot and greasy are mixed with Vali neutralizes in its own property that means healthy conditions.

"thÍé‹ Fz¤Jl‹ NlQ»š
thÍéå I§fës nehŒfS©L
thÍéš Fë®¢Ájh‹ Toondh
tªÂL« eèfD« nt¿l¤nj

thÍéš mdšjU« beŒ¥gikªjhš

thÍÎ« ml§»L« thŒikæJ
thÍé‹ Ãâfis ngh¡»lnt
tF¤ÂL« Kåbkhê f©oLnk”

- Á¤j kU¤Jth§f¢ RU¡f«

PINIYARI MURAIMAI [DIAGNOSIS]

Diagnostic methods in Siddha System are very unique and solely based on clinical acumen of the physician. It is very important part of the treatment. It is helpful to select the correct line of treatment and good prognosis. It is based upon the following diagnostic methods

- Poriyal arithal
- Pulanal arithal
- Vinaathal
- Envagai thervugal
- Udal thathukkalin nilai
- Uyir thathukkalin nilai
- Nilam

- Paruvakalam

The findings interpreted from above are delt in comparison with allopathic diagnostic parameters

1. PORIYAL ARITHAL

The physician should examine the patients porigal by his porigal

Mei	-	Feels all types of sensation.
Vaai	-	For knowing taste.
Kan	-	Meant for vision.
Mooku	-	For knowing the smell.
Sevi	-	For hearing.

2. PULANGALAL ARITHAL [INSPECTION]

The physician should examine the patients by his pulangal.

Hearing	-	Ear
Vision	-	Eye
Taste	-	Tongue
Sensation	-	Skin
Smell	-	Nose

On examination

Eyes	-	Pallor
Legs	-	Thickened Nerve
		Muscle Wasting
		Foot Drop
		Tropic ulcers

MOTOR SYSTEM

Tone

Power

Jerks

SENSORY SYSTEM:

Touch

Temperature

Pain

Pressure

Position Sense

Joint Sense

Vibration Sense

Stereognosis

3. VINAATHAL [INTERROGATION]

Vinaathal is the process of obtaining the detailed history of the disease by interrogating with the patient. By this gathering the patients name, age, occupation, native socio economic status, diet, habits, prone to any allergens complaints and duration history of past illness family history.

In the patient is unable to speak interrogate the details. Then it can be asked with his immediate relatives who are taking care of him. It is the focal point of the physician patient relationship and established the bonding necessary for patients care. About 50% the diagnosis is made up on history taking Envagai Thervugal [Eight Tools of Diagnosis].

4. ENVAGAI THERVUGAL

juâÍŸs éahÂ j‹id a£lh§f¤jhš
jhd¿ nt©LtJ nanjh bt‹åy
Âuâanjh® eho f©fŸ r¤j¤njhL
njf¤ÂdJ gçr« tUz« eh¡F
æuz ky_¤Âukhäit fUs£L«
æj« glntjh‹ gh®¤J¡ F¿¥ò§ f©L
òuzUshš bgçnah®fŸ ghj« ngh‰¿a
g©ò jtwhkš g©ojŠ braÅnu
- Á¤j kU¤Jth§f¢ RU¡f«
eho¥gçr« ehãw« bkhêéê
ky« _¤Âuäit kU¤JtuhÍj«

- nehŒ ehlš ghf« - I

The prime method adopted to diagnose disease is by means of envagai thervugal. The value of envagai thervugal is important for diagnosing purpose, which is the unique. Hence the following makes the diagnosis.

i) Naadi :

fçKfdoia thœ¤Â¡
ifjåš eho gh®¡»š
bgUéuš y§Fy¤Âš
Ão¤j eLnt bjh£lhš
XU éunyhoš thj«
ca® eLéuè‰ Ã¤j«
ÂUéuš _‹¿nyhoš
Ány¤J« eho jhnd - mf¤Âa® eho
bkŒasÎ thjbkh‹W
nkšÃ¤j nkhiuah«
Ia§fhby‹nw m¿ - f©Qrhäa«

The study of Nadi is important factor in envagai thervugal, which gives almost the correct diagnosis. The naadi can be felt one a inch above the wrist on the radial side by means of palpation and percussion with the tip of the index, middle and ring finger corresponding of Vadham, Pitham and Kapham respectively.

The three humours exists in the ratio of 1:1/2 : ¼ normally. Rearrangement of this ratio leads to various diseases.

ii) Sparisam [Palpation]

By Sparisam the temperature of the skin [heat & cold] smoothness or roughness, sweat, dryness, hard patches, swelling, abnormal growth, hypersensitiveness, thickening of nerve, can be felt.Any changes in the internal organs can be noted by palpation or percussion.

iii. Naa

By noting the tongue – the colour, dryness or wet coated or not, excessive salivation, redness, ulceration, Pallor, yellowish discoloration of the tissue, any malignant growth, conditions of teeth, its colour, condition of the gums, predominant taste in the tongue and movements of the tongue can be made out.

iv. Niram

Colour indicating Vali, Azhal, Iyam and tridhosas, yellow or pallor or redness of the skin any blush discoloration of the face, conjunctiva can be noted. There was no specific abnormality in niram.

v. Mozhi

Clarity of speech, or any disturbance loud voice, sluming, crying, talk induced by hallucination, undue argument can be made out.

vi. Vizhi

Any abnormal colour change indicating tridhosa derangements, pallor, excessive lacrimation and accumulation of secretion at the angles of the eye, subconjunctival bleeding, closure of the eyelids, visual disturbance of any specific disease of the eyes can be noted.

vii. Malam

Semisolid, quantity, froth, colour, abnormal consistency, indicating indigestion, frequency of urination constipation.

viii. Moothiram

The examination of urine is classified into two types

a. Neerkuri

It includes examination of quantity, colour, odour, froth, frequency, retention, deposits, heaviness, presence of abnormal constituents etc.,

b. **Neikuri**

Neikuri is an important test to access the predominantly affected humour.

“ãw¡F¿¡ Fiwªj ãUkhd Úç‰
Áw¡f bt©bznah® ÁWJë eLéL¤
bj‹Dw¤ Âwªbjhè nahfhik¤jÂ
ã‹wÂtiy ngh« be¿éêa¿Î«
br‹wJ òfYª brŒÂia Íznu”

i.e. A drop of gingelly oil is allowed to fall on the surface of the urine kept in a kidney tray, exposed to bright sunlight.

“mubtd Ú©oo‹ m~njthj«
Mê ngh‰gué‹ m~njÃ¤j«
K¤bjh¤J ã‰»‹ bkhêtbj‹ fgnk”

If the drop of oil

1. Spreads like a snake - Vali disease
2. Spreads like a ring - Azhal disease
3. Spreads like a pearl - Iyadisease

Snake in ring, ring in pearl, Snake in pearl - Thontha neer

In Vadha Karsanam

Naadi : Pithavadham, Vatha Pitham

Sparism : Symmetrical Sensory disturbance like numbness owing tingling , burning sensation over soles & legs, dryness of skin, hypersensitivity decreased temperature sense, inability to feel objects with hands severe loss of joint and position sense.

Naa : Pallor, parched tongue

Niram : Vellupu

Vizhi : Pallor

Malam : Black colour

Moothiram : Neerkuri – White colour

Neikuri – Spread lengthen like a snake, spreads like a ring.

5. UDAL THAADHUKKAL:

There are seven udal thaadukkal in human body. They are

1. Saaram - It strengthens the body and mind.
2. Senneer - It given power, knowledge and boldness to the mankind.
3. Oon - It gives a structure and shape to the body and is responsible for the movements of the body.
4. Kozhuppu - It lubricates the joints and facilitates their functions.
5. Enbu - It protects all the internal organs and gives structure to the body
6. Moolai - It is present in the bones and gives strength.
7. Sukkilam / Suronidham - Meants for reproduction.

In vadha Karsanam

Saaram	:	Tiredness, dryness of the skin
Seneer	:	Pallor
Oon	:	Muscular weakness
Sukkilam Suronitham	:	Impotence, sexual urge may be reduced.

6. UYIR THADUKKAL

Uyir thadukkal consists of Vadham, Pitham and Kaphan.

Vadham :

The detailed description about Vadham is described in the previous chapters. In Vadhakarsanam the following Vayu's may be affected. The findings are interpreted from Siddha and Allopathic diagnosis.

Pranan **:** Dyspnoea on exertion

Abanan **:** Constipation, nocturnal diarrhoea, Sexual impotency in male.

Viyanan : Numbness, Burning, Pricking, sensation over soles & legs, hypersensitivity, decreased temperature, sense, pallor, loss of joint and Position sense. Loss of ankle jerk, Knee jerk, Weakness of dorsiflexion of toes, difficulty in walking, foot drop.

Samanan : Affected due to dearrangement of other Vayus, increased or loss of appetite.

Koorman : Blurring of vision.

Kirukaran : Increased appetite, loss of appetite, parched tongue.

PITHAM :

Pitham does not essentially mean bile but signifies the function of thermo genesis of heat production and metabolism in its scope. The process of digestion, coagulation of blood and formation of various secretion and excretions, which are either the means or the ends of tissue combustion.

S.No.	Varieties	Function
1.	Anal Pitham [Prasagam]	It helps in digestion & dries watery substances
2.	Vanna Pitham [Ranjagam]	It gives redness, to the blood & hence formation of blood depends on ranjaga Pitham
3.	Olithe [Prasagam]	It gives luster to the skin
4.	Nokkazhal [Alosagam]	Cause the faculty of seeing
5.	Atralanal [Sathagam]	It helps in doing planned activities.

In Vadha Karsanam the following may be affected

Prasagam - Increased loss of appetite

Vanna Pitham - Pallor

Nokkazhal - Diminished Vision

Atranal - Lassitude, Malaise

Olithee - Dry skin

KAPHAM:

KAPHAM is destructive in nature, hence it destructs the foreign bodies, bacteria, Virus etc and some times normal tissues also. So it is mainly for the immune response. So kapham is essential for phagocytosis and production of antibody.

S.No.	Varieties	Function
1.	Avalam bagam	It helps in the function of other Kaphams
2.	Kilethagam	It helps in digestion by moistening the food stuffs.
3.	Pothagam	It helps in knowing different tastes
4.	Tharpagam	It gives cooling sensation to eyes
5.	Santhigam	It helps in the movement of the joints by providing lubrication.

In Vadha Karsanam the following may be affected

Avalambagam - Dyspnoea on exertion

Kilethagam - Increased or loss of appetite

GNANENDRIYAM

Responsible for sensory functions

1. Mei [skin] - Feels all type of sensation
2. Vaai [tongue] - For knowing taste
3. Kan [eye] - Meant for vision
4. Mooku [nose] - For knowing the smell
5. Sevi [ear] - For hearing

In Vadhakarsanam

Mei is affected [skin] - Paraesthesia

KANMENDRIYAM

It is responsible for motor functions

1. Kai [arm] - Majority of normal works
2. Kaal [leg] - For walking
3. Vai [Mouth] - For speaking
4. Eruvai [anus] - For defaecation

5. Karuvai[genitals] - For reproduction

In Vadha Karsanam

Kaal - Difficulty in walking

The final diagnosis is confirmed by summarizing all the clinical finds observed by the above methods.

7. THINAIGAL

The geographical distribution of the land is classified into 5 types the details are

S. No	Thinaigal	Nature of land	Common Diseases
1.	Kurinchi	Mountain and its surroundings	Iya diseases & liver disease
2.	Mullai	Forest and its surroundings	Azal disease Vali disease liver diseases
3.	Marudham	Field and its surroundings	Safety place to maintain good health
4.	Neidhal	Sea and its surrounding	Vali disease & liver diseases
5.	Palai	Desert and its surroundings	Vali, Azhal and Iya diseases

Most of the patients came from Neithal Nilam. Patients were also reported from Marudham also.

8. PARUVA KAALAM :

Siddhars have classified a year into six seasons, each constituting two months.

1.	Kaar Kaalam [Avani and Purattai] Aug 16 – Oct 15	Kutram Vali ↑↑ Azhal ↓
2.	Koothir Kaalam [Iyppasi and Karthigai] [Oct 16 – Dec 15]	Vali [-] Azhal ↑↑
3.	Munpani Kaalam [Margazhi and Thai] [Dec 16 – Feb 15]	Iyam ↑
4.	Kaalam [Maasi and Panguni] [Feb 16 – Apr 15]	Iyam ↑
5.	Elavenir Kaalam [Chithirai and Vaikasi] [Apr 16 – June 15]	Iyam ↑↑
6.	Muthuvenir Kaalam [Avani and Aadi]	Vali ↑ Iyam [-]

	[Jun 16 – Aug 15]	

↑↑ - Vetrunilai Valarchi

↑ - Thannilai Valarchi

- - Thannilai adaithal

According to the alterations of Kaalam [Thannilai Valarchi, Vetrunilai Valarchi] the diseases can be diagnosed.

MUKKUTRA VERUPADUGAL

"cŸsnjh® clè‹ TW
cW¥òfSl‹ éut e‹W
K‰Wnk nehŒfŸ ahÎ«
Kjyjåny njh‹W« nghJ
g‰Wnk thj Ã¤j
Ány‰gdªjd‰ j‹åy mt‰iw
g‰¿na njh‹W bk‹W
gf®jd® Kåt® jhnk

- mf¤Âa® FUeho

- The disease Vadha Karsanam is due to external and internal cause affect, balance in the ratio of vali and azhal.
- Vadhakarsanam is due to exacerbation of vatha and pitha kutram

- Nerve & skin are considered to be the place of vali. Blood and skin are the location for azhal.
- The exacerbation of pitham and Vadham affects the skin & nerve which inturn results gnawing pricking pain & burning sensations. The exacerbation of vali kutram denotes the diminished functions of five sensory organs.
- The inbalance causes dearrangement of Vatham & Pitham & seven udal thathukkal.

In Vadha Kutram	:	Viyanan and kirukaran are affected
In Pithakutram	:	Ranjagam & prasagam are affected
In seven Udal Thathukal	:	Saram, Seneer & Oon are affected in their diminished state.

* * * * * *

DIETARY ADVICE

The best treatment for neuropathy is to ensure that the patient gets optimum nutrition, well assimilated with all the vitamins and nutrients.

"kUªbjd nt©lhth« ah¡if¡F mUªÂaJ
m‰wJ ngh‰¿ câ‹"

-ÂU¡FwŸ

"cznt kUªJ kUªnj czÎ"

Diet is an important factor for all diseases and prevention of diseases.

For Diabetes Mellitus:

The primary dietary consideration for a diabetic patient is that he should be strict Lacto Vegetarian and take a low calories low fat, alkaline diet of high quality natural foods.

The total intake of calories is more important for a diabetic than the exact proportions of proteins, fats and carbohydrates in the diet.

A diabetic should be kept on a well balanced diet providing just enough colories to maintain ideal body weight. It is advisable to take five small meals on day/ breakfasts, mid morning snacks, lunch, tea time snacks and dinner than three large ones. Carbohydrate 50 – 75% of calories, proteins 10 – 14% (Usually 19/kg). The remainder fat (20-25%).

Fruit, Nuts and Vegetables, whole meal bread and dairy products form a good diet for the Diabetic.

Cooked Starchy food should be avoided as in the process of cooking the cellulose, envelops of the starch, granules burst and consequently the starch is so far too easily absorbed. The excess absorbed has to be get rid of by the kidneys and appear as sugar in the urine. With raw starch foods, however the saliva and digestive juices in the small intestine regulate the quantities required to be changed into sugar for the body's needs. The unused and undigested portion of raw starchy foods does not become injuries to the system.

Fibre rich foods slow stomach emptying and delay intestinal transit. So it reduce the rate of glucose absorption, lower rise of blood sugar, decrease urinary glucose excretion and also contributes to satiety. The consequent decreased food intake helps in weight reduce. A diet high in protein is good for the health, because it supplies the essential amino acids needed for tissue repair does not raise blood sugar level as much as carbohydrate. Fresh Fruits contain sugar fructose, which does not need insulin for its metabolism and is well tolerated by diabetes.

A cupful of Soyabean milk or raw juices of carrot and spinach are advisable.

Avoidance:

Tea, Coffee, White bread, White flour products, Sugar, tinned fruits, Sweets, chocolate, alcoholic drinks and smoking.

For Nutritional deficiency:

The patients should take whole grains, particularly whole wheat, brown rice, raw with sprouted seeds, raw milk, home made cheese.

In this regimen the breakfast may consist of fresh fruits a handful of raw nuts or two tables spoon of sun flower and pumpkin seeds, steamed vegetables, whole wheat chappatis, and a glass of butter milk may be taken for lunch. The dinner may comprise a large bowl of fresh, green vegetable salad, free home made cottage cheese, fresh butter and a glass of butter milk.

In severe cases the patient should be put on a short juice fast for 4-5 days before given the optimum diet. Carrot, beet root, citrus fruit, apple may be us used for juices.

A cupful of soyabean milk mixed with a teaspoon of honey should be taken every night. It tones up the nervous system due to its rich concentration of lecithin, vitamin B, and glutanic acid. Raw juice of carrot and spinach at least ½ litre per day.

Barley brew mixed with butter milk or lime juice are advisable to take daily. (Barley brew is made using 50 gms of barley with 100ml of water and reduced to 50ml by boiling).

The patient should avoid white bread, white sugar, refined Cereals, meat, fish and tinned food, tea, coffee.

Thokkanam (Massage)

It is very useful in muscular, bony or nervous disorder.

"bjh¡fz¤Â dhèu¤j¤ njhšC âitf£F
ä¡F rÎ¡»aŠr ÛuD« ngh« .. .. ..

- Á¤j® mWit kU¤Jt«

Massage is beneficial to the skin applying oil and massaging regularly in the feet roughness, immobility, dryness, fatigue, numbness are cured . It promotes strength and steadiness of feet.

YOGA:

"A sound mind in a sound body" This means proper regular exercise promotes the healthy condition of an individual.

Patients advised to do yogasanams such as Dhanurasanam, Salabasanam, Pachimothasanam and mayurasanam for controlling Diabetes Mellitus.

* * * * * *

MODERN ASPECTS

ANATOMY OF THE NERVOUS SYSTEM:

There are two major regions of the nervous systems.

1. Central Nervous System or CNS Consists of brain and spinal cord.
2. Peripheral Nervous system or PNS lying in the periphery. PNS is a collection of peripheral nerves and ganglia.

DIVISION OF PERIPHERAL NERVOUS SYSTEM :

a. **Somatic Nervous system:**

Includes the nerves supplying the skeletal muscles. It controls the movement of the body by acting on the skeletal muscles.

b. **Autonomic nervous system:**

It is concerned with regulation of visceral or vegetative function. It is divided into sympathetic & parasympathetic nervous system.

STRUCTURE OF NEURONS :

The brain and spinal cord are made up of many cells, including neurons and glial cells. Neurons are cells that send and receive electro chemical signals to and from brain and nervous system. There are about 100 billion neurons in the brain. There are many more glial cells, they provide support functions for the neurons, and are far more numerous than neurons.

There are many types of neurons. They vary in size from 4 microns [.004mm to 100 microns] to 1mm in diameter. Their length varies from a fraction of an inch to several feet.

Neurons are nerve cells that transmit nerve signals to and from the brain up to 200 mph. The neuron consists of a cell body [or soma] with branching dendrites [signal receivers] and a projection called an axon, which conduct the nerve signal. At the other end of the axon, the axon terminals transmit the electro – chemical signal across a synapse [the gap between the axon terminal and the receiving cell]. The word "neuron" was coined by the German Scientist Heinrich.

PARTS OF NEURON:

AXON:

The axon is a long extension of a nerve cell, and take information away from the cell body. Bundles of axons are known as nerves or within

the CNS [Central Nervous System] as nerve tract or pathways Dendrites bring information to the cell body.

MYELIN SHEATH:

Myelin coats insulates the axon [except for periodic breaks called nodes of Ranvier] increasing transmission speed along the axon. Myelin is manufactured by schwann cells and consists of 70 – 80% lipids [fat] and 20 – 30% protein.

CELL BODY:

The cell body [soma] contains the nucleus [with DNA and typical nuclear organalles] Dendrites branch from the cell body and receive messages.

A typical neuron has about 1,000 to 10,000 Synapses that it communicates with 1,000 – 10,000 other neurons, muscle cells and glands.

TYPES OF NEURONS :

There are different types of neurons. They all carry electro – chemical nerve signaling but differ in structure [the number of processes or axons, emanating from the cell body] and are found in different parts of the body.

SENSORY NEURONS or **BIPOLAR NEURONS**

They carry messages from the body's sense receptors [eyes, ears etc] to the CNS. These neurons has two process. Sensory neurons account for 0.9% of all neurons.

MONO NEURONS or **MULTIPOLAR NEURONS**

They carry signals from the CNS muscles and glands. These neurons have many processes originating from the cell body. Mono neurons account for 9% of all neurons.

INTERNEURONS or **PSEUDOPOLAR**

Cells from all the neural wiring within the CNS. These have two axon [instead of an axon and an dendrite. One axon communicate with the spinal cord, one with either the skin or muscle. These neuron have two processes. [Examples are dorsal root ganglia cells]

* * * * * *

PHYSIOLOGICAL PROPERTIES OF NEURON

Cells exhibit electrical properties. The function of the nerve cells are to receive initiate and conduct messages known as nerve impulse. An impulse is a combination of a mechanical, chemical or electrical change at some point in the immediate environment of the neuron. These changes consist of rapid exchange of ions across the plasma membrane, against a back ground of steady, trans membrane potential difference.

THE RESTING POTENTIAL

The neuron is identical to the trans-membrane potential in non-excitable cells. In most neurons it is about 80 inside negative. The resting potential can change either by graded potentials or action potentials. Graded potentials occur mainly across the membranes of dendrites. They are typically transient increases or decreases in resting potential i.e. the cell is relatively hyperpolarized or depolarized. Action potentials are transient complete reversals of polarity across the membranes of axons.

GRADED POTENTIAL VARIATION

May be excitatory or inhibitory to the neurons, when excitatory, they accompany an increased permeability to calcium or sodium ions, which flow down. Their concentration gradient into the cell, progressively depolarizing the membranes towards zero potential.

Inhibitory stimuli, believed to act mainly by an increasing inflow of negatively charged chloride ions, tend to increase the membrane potential opposing or reducing the total excitatory state.

THE ACTION POTENTIAL :

It is seen in peripheral nerves in contrast a brief complete, reversal of polarity due to the influx of sodium ions, followed by a rapid to the resting potential as potassium ions flow out the whole process being completed in about 5 milli sec. The action potential spreads rapidly, but unlike graded potential its size and timing do not alter.

ACTION POTENTIAL TRANSMISSION :

- ❖ Action potential is propagated to the terminal region of the nerve / synaptic region where it triggers the release of transmitter.
- ❖ Initiates a synaptic potential in the motor neuron.
- ❖ Salutatory Conduction : The depolarizing currents occur between the nodes of Ranvier.
- ❖ At the nodes Voltage – Gated channels open reducing the action potential.

- In myelinated fibers the internodes distance increases which increasing fibre diameter, thus conduction increases in proportion to the fibre diameter.
- Conduction Velocity in unmyelinated fibers is proportional to the square root of the fibre diameter.

SYNAPSE :

Synapse is the junction or discontinuity between the axon of one neuron and the dendrite of another. Release of chemicals at the synapse provides for the transmission of impulse from neuron to neuron. The termination of a nerve fiber in a muscle cell is referred to as motor end plate. The chemical released from the terminal portion of the axon can have a excitatory or inhibitory effect on the transmission of impulses across a synapse.

NEUROGLIA

Neuroglia or glial cells are far more numerous than neurons. Most neuralgia, retain the ability to divide, whereas most neurons do not. There are five types of neuroglias. Astiocytes serve as a major supporting tissue to the CNS and participate with the endothelium to form a permeability barriers called the blood brain barriers, between the blood and the nerve cells. Ependymal cells line the fluid filled carities within the CNS. Some ependymal cells produce cerebrospinal fluid. Microglia help remove

bacteria and cell debris from the CNS, Oligodendrocytes and schwanns cells in the PNS surround axons.

MYELIN SHEATHS :

Axons are surrounded by the cells process of oligodendrocytes and schwan cells. Myelinated axons have specialized sheaths called myelin Sheaths, wrapped around them. Each oligodendrocyte process or schwann cell repeatedly wraps around a segment of an axon to form a series of tightly wrapped cell membranes. Myelin is an excellent insulator which prevents almost all ion flow through the cell membrane. Gaps in the myelin sheath, called nodes of Ranvier, can be seen about every 1mm between the oligodendrocyte segments or between individual schwann cells. At the node of ranvier, ion flow easily between the extra cellular fluid and the axon, the action potentials develop.

PERIPHERAL NERVES

BASIC STRUCTURE OF PERIPHERAL NERVE FIBER

Each nerve fiber has a central core formed by the axon. This core is called axis cylinder. The plasma membrane surrounding the axis cylinder is the axolemma. The axis cylinder is surrounded by a myelin sheath. This sheath is in the form of short segments. That are separated at short intervals called the nodes of “Ranvier”. The part of the nerve fiber between two consequetive nodes is called as inter node. In each segment of the myelin

sheath there is a thin layer of schwann cell cytoplasm. This layer of cytoplasm is called the neurilemma.

Each nerve fiber is surrounded by a layer of connective tissue called the endoneurium. The endoneurium holds the adjoining nerve fibers together and facilitates their aggregation to form bundles of fasciculi. Apart from collagen fibers the endoneurium contains fibroblasts, schwann cells, endothelial cells and macrophages.

Each fascicules is surrounded by a thick layer of connective tissue called the perineurium. The perineurium is made up of layers of flattened cells separated by layers of collagen fibers. The perineurium probably controls diffusion of substances in and out of axons.

A very thin nerve may consist of a single fascicules, but usually a nerve is made up of several fascicule. The fascicule are held together by a fairly dense layer of connective tissue that surrounds the entire nerve and is called the epineurium. The epineurium contains fat which cushions never fibers. Loss of this fat on in bed ridden patients can lead to pressure on nerve fibers and paralysis.

Classification of Peripheral nerve fibers

Type	Sub Type	Efferent	Afferent Group I &II	Diameter [μ]	Velocity of conduction [meters / second]
A	Alpha α	To extrafusal muscle fibers	From Encapsulated receptors insulin, joined and guts.	12 - 21	70 to 120
	Delta β	Some collateral of Aα fibers to intrafusal	From thermo receptors & nociceptors	2 – 5	12 to 15

		muscle fibers			
	Gamma γ	To introfusal muscle fibers		5 – 6	15 to 30
B		Preganglionic autonomic	From skinviscera from free nerve endings in connective tissue of muscle [group] in	1 – 2	3 to 10
C		Post ganglionic	Interoceptive fibers from thermo receptors & Nocioceptors [Group IV]	< 1.5	5 to 2

The velocity of impulse through or nerve fiber is directly proportional to thickness of fibers

Except C fibers, all the nerve fibers are myelinated.

PARTS OF THE PERIPHERAL NERVE :

The dendrites and axons are usually called nerve fibers. Most of the axons are insulated by myelin sheath and are called myelinated nerve fibers. Those without myelin sheath are known as non-myelinated fibers. Axons smaller than 5 to 10mm in diameter are usually non-myelinated.

SCHWANN CELLS [LEMMOCYTES]

Schwann cells are satellite cells of the peripheral nervous system; all peripheral axons are ensheathed by them and are separated from the endoneurium by schwann cell plasma membrane. It participate in the supply and metabolises trophic factors to axons, in the maintenance of the various factor.

MYELIN SHEATH :

In formation of myelin sheath around the axon is called the myelinogenesis. In the peripheral nerve, the myelinogenesis starts at 4^{th} month of intrauterine life. It is completed only in the second year after birth.

Before myelinogenesis, schwann cells of the neurilemma are very close to axolemma as in the case of unmyelinated nerve fiber. The membrane of the schwann cell is double layered. The schwann cells wrap up and rotate around the axis cylinder in many concentric layers. The concentric layers fuse to produce myelin sheath but the cytoplasm of the cells is not deposited outermost membrane of schwann cell remains as neurilemma – Nucleus of these cells remains in between myelin sheaths & Neurilemma.

FUNCTIONS OF MYELIN SHEATH :

It is responsible for faster conduction of impulse through the nerve fibers. In these nerve fibers, the impulses jump from one node to another. Myelin sheath also has a high insulating capacity. Because of this, the myelin sheath restricts the nerve impulse within the single nerve fiber & prevents the stimulation of neighbouring nerve fibers.

NODE OF RANVIER [NEUROFIBRAL NODES]

In myelinated nerves the axon is exposed to the extra cellular fluids at regular intervals or nodes [of Ranvier] where short gaps exist between adjacent schwann cells.

In peripheral nerves, the myelin sheaths on both sides of nodes usually expand as paranodal bulbs. The external paranodal cytoplasm of the schwann cells sends a number of digital processes which curve to contact the naked nodal axolemma.

BLOOD NERVE BARRIER :

Peripheral nerve fibers are separated from circulating blood by a blood nerve barrier. Capillaries in nerves are non- fenestrated and endothelial cells are united by tight junctions. There is a continuous basal lamina around the capillary. This barrier is reinforced by cells layers present in the perineurium .

CONDUCTION IN PERIPHERAL NERVES

The action potential is transmitted through the nerve fiber as nerve impulse. Conduction of impulse through a myelinated nerve fiber is about 50 times faster than through a non myelinated fiber. Myelin sheath forms on effective insulator and flow of current through a non – myelinated fiber. Myelin sheath forms on effective insulator and flow of current through this sheath is negligible. The entry of sodium from extra cellular fluid into nerve fiber occurs only in the node of Ranvier. This causes depolarization in the node and not in the inter node. Thus depolarization occurs at successive nodes. So the action potential jumps from one node to another. This is called “Salutatory conduction”

DEGENERATION AND REGENERATION OF NERVE FIBERS :

When a nerve fiber is injured various changes occur in the nerve fiber and nerve cell body. The injury may occur due to obstruction of blood flow, local irritation to toxic substances, crushing of nerve fiber or the transection of the fiber.

DEGREES OF INJURY :

When a nerve fiber is injured, various changes occur in the nerve fiber and nerve cell body. All these changes are together called as degenerative changes. There are five degree of injury of a nerve fiber.

FIRST DEGREE OF INJURY :

First degree injury is the most common type of injury of the nerves. It is caused by applying pressure over a nerve for a short period leading to occlusion of blood flow and hypoxia.

By the first degree of injury, the axon is not destroyed but mild demyelination occurs. The axon looses the function for a short time which is called conduction block. The function returns within a few hours to few weeks.

SECOND DEGREE OF INJURY :

It is due to the severe prolonged pressure which cause Wallerian degeneration. Here the endoneurium is intact. Repare and restoration of function take about 18 months. Second degree of injury is called axonotmesis

THIRD DEGREE OF INJURY :

In this case, the endoneurium is interrupted. Epineurim and perineurium are intact. After degeneration, the recovery is slow and in complete. The third, fourth and fifth degree of injury are called neurotmesis.

FOURTH DEGREE OF INJURY :

This type of injury is more severe. The epineurium and perinerium is also interrupted. The fascicule of nerve fibers are disturbed and disorganized. Regeneration is poor or incomplete.

FIFTH DEGREE OF INJURY :

Fifth degree of injury involves complete transection of the nerve trunk with loss of continuity. Useful regeneration is not possible unless the cut ends are rearranged and approximated quickly by surgery.

CHANGE IN NERVE CELL BODY :

The changes in the nerve cell body commence within 48 hours after the section of nerve. First, the nissle granules disintegrate into fragments by a process called chromatolysis, the golgi apparatus is disintegrated. The cell body swells due to accumulation of fluid and becomes round. The neurofibril disappears followed by displacement of the nucleus towards the cell membrane. Sometimes the nucleus is extruded out of the cell. In this case death of the neuron occurs.

WALLERIAN DEGENERATION :

The degeneration at proximal end along with degeneration of cell body.

RETROGRADE DEGENERATION :

The degeneration at prodecimal cut end along with degeneration of cell body.

TRANSNEURONAL DEGENERATION :

If an afferent nerve fiber is cut, the degenerative changes occur in the neuron with the afferent nerve fiber synapse.

CHANGES DURING REGENERATION :

The degenerated nerve fiber may be regenerated. The injured nerve fiber can regenerate only under favourable conditions. It starts as early as 4^{th} day after injury, but becomes more effective only after 30 days and is completed in about 80 days.

The regeneration occurs if the following criteria are fulfilled.

- The gap between the cut ends of the nerve should not exceed 3 mm
- The neurilemma should be present.
- Nucleus must be intact.
- The two cut ends should remain in the same line.

STAGES OF REGENERATION :

1. First the cells of schwann from the proximal and distal cut ends of the nerve grow out in all directions in the form of pseudopodia like fibrils. The fibrils from one end establish contact with the fibrils of the other end and fill up the gap between two cut ends. The activity of the proliferating is greaten is distal end. The filling up of the gap leads to the development of neurilemmal tube.
2. Later the axis cylinder is fully established inside the neurilemmal tube. These process are completed in about 3 months after injury.
3. The myelin sheath is formed by the cells of schwan slowly. The myelination is completed in one year.
4. The diameter of the nerve fiber gradually increases (obtains only 80% of original diameter)
5. In the nerve cell body, first the Nissl granules appear followed by Golgi apparatus.
6. The cell losses the excess fluid and the nucleus occupies the central portion.
7. Though the anatomical regeneration occurs in the nerve, the functional recovery occurs after a long period.

DISORDERS OF PERIPHERAL NERVES

PERIPHERAL POLYNEUROPATHY

Synonyms:

Peripheral neuritis, Polyneuritis, Peripheral neuropathy.

Definition:

Peripheral nervous system includes the somatic spinal nerves with their terminal branches, plexus, ventral and dorsal roots, dorsal root ganglion cells, interior horn cells, Cranial and autonomic nervous system affecting one or more of the components.

Peripheral neuropathy may manifest as paraesthesia, muscle atropy, Sensory loss due to a mixture of slight loss of dexterity and sensory impairment make the diagnosis more obvious even though the aetiology often remains obscure.

In all age group of very detailed family history is vital. If there is any doubt it is worth examining an inherited disorder is present. A detailed history of all drugs used with in the previous two years and any possible chemical exports diabetes mellitus dietary habits, previous surgical procedures and alcohol intake should be included.

Aetiology:

Numerous Conditions are known to cause peripheral nerve damage

Nutritional deficiency	:	Vitamin deficiency Thiamine, (alcohol abuse), Folic acid, Cyanocobalamin, Riboflavin, Nicotinic acid, Pyridoxine, Pantothenic acid, Malabsorption Syndrome.
Metabolic disease	:	Diabetes Mellitus, Renal and hepatic failure, Acuteintermittent porphyria, Hypothroidism.
Infection	:	Leprosy, Diptheria, HIV, Herpes Zoster.
Toxins	:	Heavy metals, Organic Solvents
Drugs	:	Drugs - amiodarone, Vincristine, Phenytoin.
Genetic	:	Hereditary motor & Sensory Neuropathy, Congenital Sensory neuropathy.

Ischaemia	:	Collogen Vascular disease, atherosclerosis
Physical agents	:	Injuries, Pressure palsy, entrapment neuropathy, coldinjury, radiation.
Miscellaneous	:	Carcinoma, Myeloma, Sorcoidosis.

PATHOLOGY:

Three basic pathological process affect the peripheral nerve fibers.

1. Wallerian degeneration:

If follows transection of an axon by crushing or injury with the myelin sheath and axon degenerating distal to the site of division.

2. It is the most common change, metabolism of the neuron is usually affected, resulting in degeneration of the distal portion of the axon.

3. Segmental degeneration:

It result from the schwann cell or from a direct attack on the myelin and the myelin sheath is primarily destroyed leaving the axon intact.

In Axonal degeneration;

The damage may be either on the axon or on the cell body.

Focal : In trauma, infarct & injection paralysis.

Diffuse: Uraemia, arsenic, mercury intoxication.

- There is increase in lysosomal and oxidative enzymes in schwan cell.
- Degenerative changes with swelling and fragmentation.
- Myelin breakdown and formation of myelin ovoids occur within the schwann cell cytoplasm.
- Myelin debris are removed by macrophages by two or three weeks.

In retrograde degeneration

- Central chromatolysis also occur in the perikaryon..

- Loss in Nissl granules
- Swelling of cell body and Peripheral migration of nucleus may occur Distal degeneration of axon occur will significant change in the proximal portion (Dying back)

In Segmental demyelination:

Some schwann cells are primarily affected sparing the axons and others schwan cells. Eg.Diptheric neuropathy and Guillian Barre Syndrome

- Increased irregularity of myelin sheath.
- Widening of nodal gap

Demyelination results in concentric layers of schwann cells arranged around on axon. Increase in collagen occurred from these recurrent episodes of demyelination results, thickening of nerve.

Axonapathy:

Pathological changes primarily in axons.

Eg., Nutritional deficiency states, toxic neuropathies

Myelinopathy:

Pathological changes primarily in Myelin sheath.

Eq., Guillian Barre Syndrome, Diphtheritic neuropathy.

Both types:

Eg., Diabetes, Uraemia, Leprosy.

NUTRITIONAL DISORDERS OF THE NERVOUS SYSTEM

The neuropathy due to Nutritional deficiency presents as a symmetrical distribution both pathologically and clinically. The exact nutrient lacking cannot be defined and a combination of dietary defects may

be necessary for a given disease to develops. Mostly nutritional deficiency reflect depletion of B group vitamins.

Thiamine [Vitamin B_1] deficiency :

Deficiency of thiamine may cause a symmetrical, mixed sensory – motor neuropathy. This is also observed with Alcoholics, Diabetes, cancer and other chronic illness.

- Thiamine pyrophosphate or Cocarboxylase functions as a cofactor in Carbohydrate metabolism.
- As a coenzyme in the decarboxylation of α – ketoacids.
- Deficiency results in accumulation of lactic acid and reduction in oxygen uptake Thiamine deficiency occurs particularly in chronic alcoholics.
- Thiamine deficiency is characterized by axonal neuropathy.

Clinical Features :

Symmetrical, mixed Sensory – motor neuropathy. The onset of symptoms is usually insidious and progression is slow. Lower extremities tend to be involved earlier and more severely than the upper extremities.

- Numbness or tingling paresthesias distally in the limbs frequently accompanies by pain [usually dully and aching].
- Cramps in the feet and calf muscle.
- Disabling dysesthetic sensations.

Motor Manifestation :

- Distal Weakness, foot drop, steppage gait, distal muscle atrophy may occur.
- In acute cases muscles may be tender to palpation.
- Tendon Reflexes are reduced or lost.

Sensory changes :

- Reduced or loss of vibratory sense particularly in the ankles.
- Impaired prioprioception.
- Reduced cutaneous sensation in the form of a distal impairment of pain and touch in glove and stocking distribution.
- Reduced Thermal sensibility.

NIACIN [NICOTINIC ACID] DEFICIENCY

Chromatolytic changes occur in neuron [the central neuritis]. The peripheral nerves show a patchy loss of myelin & axons.

Clinical features :

- Tenderness of nerve trunks and muscles, cramps
- Distal Weakness of limb
- Depressed tendon reflexes
- Distal impairment of cutaneous sensibility
- Loss of prioprioception and vibration sense
- Occasional appearance of extensor plantar response
- Decrease corneal reflex and impaired papillary light reflex.

PYRIDOXINE [VITAMIN B_6] DEFICIENCY

Polyneuropathy due to pyridoxine deficiency is found in patients treated for tuberculosis with is nicotinic and hydrazide [INH] an agent that inhibits pyridoxine phosphorylation. The lack of pyridoxal phosphate functioning as a coenzyme for serine palmity transference [as required for

the synthesis of sphingomyelin] of aminoacid decarboxylase or both may be responsible for the polyneuropathy.

Clinical features :

Numbness and tingling in the lower limbs together with tenderness in the calf muscle and pain [often burning] distally in the limbs.

- Reflex loss, impairment of superficial sensation and weakness in the lower extremities.
- Vibratory and position sense may be impaired.
- Sensory ataxia is often prominent.

Complete recovery may occur in patients with a mild neuropathy who had been taking only low doses of vitamin.

COBALAMIN [VITAMIN B_{12}] DEFICIENCY :

Vitamin B_{12} deficiency may lead to serious disease involving both central and peripheral nervous system. Vitamin B_{12} deficiency rarely arises from deficient intake except in the case of strict vegetarians. Failure of Vit B_{12} absorption may due to gastric or intestinal causes. In pernicious anemia, intrinsic factor production is defective because of an autoimmune gastritis. Deficiency may also occur in tape worm infestation, coeliac disease, sprue, gastric malignancy, chronic gastritis, thyrotoxicosis and following gastrectomy and gastro jejunostomy.

Pathogenesis

Features of peripheral nervous system disease may occur as a reflection of deficiency in R binder protein, responsible for extra cellular transport of vitamin B_{12} in plasma. Vit B_{12} deficiency impairs the function of methionine and this leads to production of abnormal fatty acids which alters the production of myelin.

The essential lesion is degeneration of the myelin sheaths and axis cylinders. The myelin swells and later disintegrates. When degeneration is

severe the muscles are wasted in the later stage and the muscle fibers produces local diminution in size and poor striation.

Sometimes the blood is normal but usually some changes can be found although it may no more than trivial macrocytosis, however the blood and bone marrow shows typical features of a megaloblastic anemia.

SYMPTOMS :

The first symptom is usually numbness or tingling in the feet, associated with weakness and stiffness of the legs and a spastic gait.

Examination shows, weakness of the toes or in dorsiflexion of the feet, diminution or absence of the ankle jerk, extensor plantar, reflex and a variable degree of sensory loss. There may be tenderness of the feet or calf muscles. Romberg's sign in positive. The superficial sensory loss is at first only over the feet, then it spreads up to cover a sock area and later has a stocking distribution. At that stage the arms may be normal.

If the condition is allowed to progress the signs of peripheral nerve disease may predominate. The knee jerks become deminuted and the ankle jerk lost, the muscle below the knee eventually wasted. In the upper limb a variable degree of sensory loss may develop with astereognosis in the hands and loss of superficial sensation over glove area. There is considerable loss of pain and temperature appreciation and decrease in distal sensory nerve conduction velocity.

ALCOHOLIC NEUROPATHY

Neuropathy is the most frequently encountered chronic neurologic disorder related to alcohol. Although both mutational deficiency and a direct basic effect of alcohol. Chronic intake of high dose of ethanol cause peripheral neuropathy which is related to thiamine deficiency.

Pathology :

Axonal degeneration appears in the pathogenic process segmental demyelination also occurs and may be secondary to the primary axonal disorders or a consequence of concomitant mutational deficiency.

Symptoms :

Usually presents as a distal, symmetrical sensory motor neuropathy that is typically gradual in onset. Weakness, paraesthesia, muscle cramps, numbness, ataxic gait and burning dysesthesias.

Neurological examination :

It may reveal any combination of reflex sensory and motor abnormalities with predominant involvement of the legs. Absent or decreased reflex impaired vibration sense. Defective appreciation of light touch and weakness. Pain & temperature sensations are affected less often. Autonomic dysfunction and cranial involvement are rare.

DIABETIC NEUROPATHY

Diabetic neuropathy is one of the commonest chronic metabolic complications of diabetic individuals. The incidence is variable, ranging from 15 to 60%. In older age over 40 years, the incidence is higher.

CLASSIFICATION OF DIABETIC NEUROPATHY :

SYMMETRIC :

1. Distal, Primarily sensory neuropathy.
    a. Mainly large fibers affected
    b. Mixed
    c. Mainly small fibers affected
2. Autonomic neuropathy
3. Chronically involving proximal motor neuropathy.

Asymmetric :

1. Acute or Sub acute proximal motor neuropathy.
2. Cranial mono neuropathy.
3. Truncal neuropathy.
4. Entrapment neuropathy in the limbs.

Pathogenesis :

Metabolic hypothesis :

- Accumulation of sorbital and decrease of myoinosital in neural tissue.
- Myoinosital is a precursor of the phosphoino sitedases, which are important in membrane control phenomena.
- Decreased myoinosital content correlates with a defect in Na^+ / K^+ ATP are activity lead to changes in the conduction properties of excitable cells.

- Amino acid synthesis and uptake by neurons is altered in diabetes and changes in local axonal transport of structural proteins.

VASCULAR & HYPOXIC HYPOTHESIS :

- Endoneurial hypoxia is due to changes in capillary blood flow and is accompanied by biochemical changes.
- The vessel changes include thickening of basement membrane and increase in the number and size of capillary endothelial cells and reciprocal decrease in the capillary luminal area. Changes in axons and schwann cells are then secondary to these vascular alterations.
- When proteins are exposed chronically to high levels of glucose, non enzymatic glycolsylation occurs.
- This alters the interaction between proteins and may have effects both inside and outside the cell. Extra cellular matrix proteins are particularly involved, this may be the mechanism of basement membrane thickening.
- Major pathological change is multifocal axonal loss identical to that micro vascular ischemia of nerve.
- The fibre loss is associated with increased number of closed capillaries in diabetic sural nerves.
- If vascular changes and hypoxia relate directly to hyperglycemia then control of blood glucose concentration is the ideal primary therapy for neurological complications.

DISTAL SYMMETRICAL POLYNEUROPATHY :

Clinical Features :

This is the most common type of peripheral nerve disorder, estimated to be present in about 40% of individuals with diabetes of long duration. Symptoms usually insidiously may be positive or negative.

1. A "Large Fiber" Pattern

Parasthesias in legs, absent ankle jerks and impaired sense of light touch, vibration and position in the lower limbs. Slight distal weakness is common and the hands may become involved.

2. A "Small Fiber" pattern :

Dull aching pain in the lower limbs, worse at night, and mainly felt on the anterior aspect of the legs, burning sensation in the soles of the feet, cutaneous hyperaesthesia and an abnormal gait [common wide – based] position and vibration sense, deep tendon reflexes and strength are usually spared. Autonomic nervous dysfunction may accompany with this variant.

3. Rare "Pseudo diabetic" pattern :

Associated with long term diabetes. Severe reduction of cutaneous and deep sense permits ulceration of the feet and distal joint deformity. Romberg's sign is present, tendon reflex are absent in the legs, hypotension and Argyl Robertson pupils may be observed.

Autonomic Neuropathy :

Diabetic autonomic neuropathy generally associated with symmetric sensory neuropathy.

Gastrointestinal disturbances :

Gastro paresis, episodic nocturnal diarrhoea.

Cardio Vascular :

Postural hypotension, elevated heart rate, loss of sinus arrhythmia.

Genito Urinary :

Impotence is sometimes the initial manifestation disordered micturition with large residual volume, retrograde ejaculation.

INVESTIGATION OF THE PERIPHERAL NEUROPATHY

Conduction Studies :

When a patients symptoms include weakness a wasting, undue fatigability, sensory impairment or parasthesias, it is usually desirable and often essential to supplement clinical examination by the study electrical activity in nerve conduction and in detection of mild neuropathy, the location of sites of compression in mono-neuropathy and allow demyelinating neuropathies to be distinguished from axonal degeneration.

Electrophysiological studies:

In generalized symmetrical neuropathies there is impairment of motor and sensory conduction.

Electromyography:

Electro myography detects and distinguish between disorders of enterior horn root plexus, peripheral nerve, neuro-muscular junction and muscle to determine this extent and severity. Specific pathological changes such as inflammation in muscle or demyelination of nerve can be inferred.

NERVE BIOPSY :

Nerve Conduction tests :

The response to stimuli, such as pressure, vibration and temperature to check for neuropathy.

CLINICAL FEATURES

Clinical features may be due to affection of the motor, sensory or autonomic fibers separately or in combination.

It may be positive i.e. irritative in nature or negative i.e., due to loss of function.

Positive Phenomena:

- Paraesthesia in the form of tingling, pin & needles
- Contact dysaes-thesia : Where contact with the affected part elicits the disturbing sensation
- Burning Feet : This is a frequent symptom, but its mechanism is not clear. It may occur in neuropathies accompanying alcoholism, diabetes and nutritional deficiency.
- Hyperalgesia : Pain sensation may be felt perceived at a low intensity of stimulation.
- Lancinating pain : Felt in the legs while sitting and during sleep. Getting up and walking often relives the symptom.

Negative Phenomena:

- Numbness is an important negative symptom which indicates that atleast 50% of the nerve fibers are destroyed.
- Patients may have a feeling as though they are walking on cotton wool.
- Liability to feel the objects with hands.
- Severe loss of joint and position sense results in unsteadiness of gait, particularly marked in dark.
- Glove and stocking distribution. Sensory loss is symmetrical and maximal in the distal parts of limbs. The patient may complain wooden feeling.
- Pain less ulcers or other trophic changes.

Motor Manifestations:

- Weakness in the Feet; Weakness of dors flexion of toes [best seen in great toe] symmetrical weakness and wasting of distal parts of the limbs.
- Difficult in holding objects, mixing food, cupping the hand, raising the arms as in combing hair, gripping slippers or gait disturbances.
- Fasciculation.
- Oculomotor, Trigeminal, facial, glossopharyngeal, Vagus and accessory nerves may be affected

Deep Tendon reflex :

Sluggish or absent tendon jerks even with normal motor power & muscle bulk.

Earliest cases ankle jerk is lost.

Autonomic disturbances :

- Postural hypotension
- Sweating disturbances
- Tropic disturbances
- Nocturnal diarrhoea
- Impotence

Nerve Thickening :

- Gross in leprosy
- Milder degree in peroneal muscular atrophy.

TREATMENT FOR PERIPHERAL NEUROPATHY :

The treatment for neuropathy is to make the symptoms better. The therapy depends upon the cause.

For Example :

Due to Diabetes Mellitus:

Therapy for peripheral neuropathy due to diabetes involves control of it. To prevent the progression of neuropathy blood sugar level should be controlled. Improved control often relieves pain and prevents or delays further problem. Foot care is also essential part of treatment for neuropathy affecting the lower extremities.

- Treatment for diabetic neuropathy includes.
- Drugs to relieve pain and treat neurological problems.
- For burning sensation wrap the feet with wet cloth.
- Relief of pain – Hot Packs or soaks or Infra red light.
- Topical Cream Application
- Dietary modification.
- Prevention of foot drop & wrist drop and contractures by splints or sand bags.
- Moderate exercise such as brisk walking should be done.
- Care should not be taken not to over strain weak muscles.
- Check the feet daily.

Due to Nutritional Deficiency:

Treatment for nutritional neuropathy includes, restoration of a well balanced diet with supplemental vitamins of the B group especially thiamine is the keystone of the therapy. This includes intake of dietary sources like whole grains, unmilled rice, peas, nuts and exclusion of raw fish, coffee, tea, betel nuts which contain thiaminase, the enzyme that destroy the dietary supply of thiamine.

Prognosis:

The outcome greatly depends on the cause of the neuropathy. In cases where a medical condition can be identified and treated, the prognosis may be excellent.

Prevention:

Neuropathy can be prevented, at least in some cases. For example, The diabetes control and complications in people on tight control of blood sugar level prevents the development of neuropathy in the diabetes and decreases the severity of symptoms. Care of soles and hands is needed Maintaining ideal weight and Regular exercise and practicing yoga etc.

The alcoholic patients should abandon consuming alcohol and intake of diet rich in B group vitamins, is needed.

* * * * * *

MATERIALS AND METHODS :

The disease VADHA KARSANAM has been dealt in the book of Yugi Vaidhya Chindhamani .

For this clinical study 40 patients of both sex of different age groups, suffering from vadha karsanam especially due to Diabetes mellitus, Nutritional deficiency were selected of the post Graduate department of pothu maruthuvam GSMCattached to Arignar anna Hospital, chennai

In this 20 were admitted as in patients. After a degree of prognosis of their symptoms they were advised to come to outpatient department for further follow-up. Another 20 patients were treated in the out-patient department separately.

Criteria for assessment:

The admission of cases were strictly subjected to pre designed protocol comprising clinical features, investigations, diagnosis and treatment aspects. The following signs and symptoms are taken for criteria for assessment.

1. Numbness
2. Difficulty in Walking
3. Dryness of the tongue
4. Burning sensation felt over soles & legs
5. Heaviness of the body.
6. Pallor
7. Dry skin
8. Formication
9. Pricking and tingling sensation
10. Distal Muscle Weakness

Associated Signs & Symptoms :

1. Polyuria, Polyphagia, Polydypsia
2. Malaise
3. Palpitation

4. Constipation
5. Colicky abdominal Pain

A detailed clinical study was taken regarding present and past illness occupation, socio economic status, personal history, family history, related past dietary history, personal habits & associated habits.

Study of Siddha mode of Diagnosis:

The cases were recorded in a prescribed proforma prepared on the basis of Siddha methodology. A proper follow up to the admitted cases were done and individual case sheet were maintained.

Laboratory Investigations;

All the cases were subjected to clinical investigation include TC, DC, ESR, HB, Blood Sugar, Urea, Serum cholesterol and Urine test for albumin, Sugar and deposits.

Special investigations like peripheral blood smear in some patients had done in the private laboratories because of the limited infra structure within the college hospital by me.

On the basis of these investigations modern diagnosis and a parallel Siddha diagnosis were made with the help of the following criteria such as poriyal arithal, Pulanal arithal, Mukkutra Nilaigal, Envagai Thervugal, Ezhu Udal Kattugal etc.

Selection of the Trial Drug:

According to thridosha theory laxatives were first given. Nilavagai Choornam 10 gm with hot water at bed time was recommended before starting the specific treatment.

The patients is treated with the drug.

Internal Medicine:

1. Name : Kukilathy Choornam
   Dose : 2 gms
   Vehicle : Hot water
   Thrice daily after food

2. Name : Vetiver Thylum

Dose : 30ml

For application

Reference:

1. Sarabendrar Vadha Roga Chikitsai Page No: 97
2. Kannusamiyam Parambarai Vaidhyam Page No: 286

Diet:

Pathiyam or Bed side Regimen was strictly advised for all patients. Yoga and exercise were also advised. A well balanced diet which include a sufficient amount of Vegetables, fruits and cereals for organic minerals and vitamins together with other elements in a right proportion.

Thokkanam Therapy:

Patients were advised to attend Thokkanam Therapy daily.

Evaluation of Trial Drugs:

The trial drugs used in this study were subjected to biochemical and microbiological analysis in the Government Siddha Medical College, Chennai.

PREPARATION AND PROPERTIES OF TRIAL DRUG

The Trial drug **KUKILATHY CHOORNAM** contains

Mjhu üš : ru ngªÂu it¤Âa KiwfŸ - g¡f« v©.97

1. R¡F, äsF, Â¥Ãè - 17.2 Gm
2. fL¡fhŒ, bešè¡fhŒ, jh‹¿¡fhŒ - 17.2 Gm
3. Óuf« - 17.2 Gm
4. gw§»¥g£il - 70 Gm
5. F¡FY - 175 Gm

1. **R¡F**

Botanical Name : Zingiber officinale

Family : Zingiberaceae

Part used : Under ground dried stem

Rit : if¥ò, fh®¥ò j‹ik : bt¥g« ÃçÎ : fh®¥ò

msitÍwh¡ fhu« milªÂU¡F« thj

éisitbaš yhkW¡F« bkŒna - äs»‹fhŒ

f©lt®¡F« Ï‹gkh« fhçifna! - Óœ_y§

bfh©lt®¡F e‹kUªjh§ - TW

- mf¤Âa® Fzthfl«

Actions:

Carminative

Antivadha

Antidote

Â¥Ãè:

Botanical Name : Piper Longum

Family : Piperaceae

Part used : Unripen fruit

Rit : Ïå¥ò j‹ik : bt¥g« ÃçÎ : Ïå¥ò

Fz«:

f£o baÂ®ã‹W fLnehbaš yh«gâÍ«

Â£o éidafY« njfbk¤j ò£oah«

khkD¡F khkbdd k‰wt®¡F k‰wtdhŒ

fhabkDª Â¥Ãè¡F if

Action: Stomachic

Carminative

fL¡fhŒ

Botanical Name : Terminalia Chebula

Family : Combretaceae

Part used : Fruit

Rit : Jt®¥ò j‹ik : bt«ik ÃçÎ : Ïå¥ò

Fz«:

“jhil fG¤j¡» jhY F¿æ›a

Õil ÁègjKù ngÂKl« - Mil ba£lhj

öyäo ò©thj nrhâfh kiyæu©

lhyäo ngh« tç¡fh ahš”

Action : Stomachic, digestive, laxative, antioxidant

bešè¡fhŒ:

Botanical Name : Phyllanthus Emblica

Family : Euphorbiaceae

Part used : Dried unripen fruit

Rit : òë¥ò, Jt®¥ò j‹ik : j£g« ÃçÎ : Ïå¥ò

Fz«:

tkd« mnuhÁaW« thjKj‹ _‹WŠ

Rkd KWkyKŠ rhW« - mkhdRu«

òšètU njhlr‹å bghšyh¢ bray« ngh«

bešèku ntiu ãid

Action : Refrigerant, laxative, Tonic, Astringent

jh‹¿¡fhŒ

Botanical Name : Terminalia Bellerica

Family : Combretaceae

Part used : Fruit

Rit : Jt®¥ò j‹ik : bt«ik ÃçÎ : Ïå¥ò

ÁyªÂél« fhäa¥ò© ÓHhd nkf§

fyªJtU« thjÃ¤j§ fhnyh – ky®ªJlèš

C‹¿¡fhŒ bt¥g KÂuÃ¤ J§fu¡Fª

jh‹¿¡fhŒ ifæbyL¤ jhš

Action : Astringent, Tonic, Laxative, Expectorant

Óuf«:

Botanical Name : Cuminum Cyminum

Family : Umbelliferance

Part used : Seed

Rit: fh®¥ò, Ïå¥ò j‹ik : j£g« ÃçÎ : Ïå¥ò

Fz« :

Ã¤jbkD kªÂçia¥ Ã‹d« gL¤Âat‹

r¤JUit ÍªJwªJ rhÂ¤J – k¤jbdD«

uhridÍ pbt‹W e©ig¥ gy¥gL¤Â

nghrdF ghçbrŒÍ« ngh®

(nju‹bt©gh)

Action : Carminative Stimulant,
Stomachic Astringent

gw§»¥g£il:

Botanical Name : Smilax China

Family : Liliaceae

Part used : Root

Rit : Ïå¥ò j‹ik : j£g«, ÃçÎ : Ïå¥ò

Fz«:

jhf« gythjª jhJe£l« ò©Ãsit

nkf§ fo»uªÂ Åœ_yª – njfKl‹

F£il gfªjnk‰ bfhŸtkz« ngh«g‰§»¥

g£ilæid Í¢rç¤J¥ gh®. (nj.F)

Action : Alterative, Antisyphitilic
Aphrodisiac, Depurative

F¡FY:

Botanical Name : Shorea robusta

Family : Dipterocarpaceae

Part used : Resin

Rit : if¥ò, j‹ik : bt¥g« ÃçÎ : fh®¥ò

Fz«:

fhjfu ehÁnehŒ f£ofo nkf¥ ò©

thjé¤Â uŠNiy t‹Fef« - XÂitæ¤

Â¡» èU¡f¤ ÂlKŸs nthÎga¡

F¡» èU¡fek¡ FŸ

Action : Stimulant, Expectorant. Diuretic

F¡»yhÂ Nuz«

Ït‰iw Ïs« tW¥ghf tW¤J bgho brŒJ, F¡FYit vU¡»iyæš ftÁ¤J 10 tw£oæš òlä£L nt¥g«g£il rh‰¿š Jyh aªÂukhf vç¤J R¤Â brŒj F¡FYit Nuz¤Jl‹ bgho¤J fyªJ vL¤J¡ bfhŸsÎ«.

ÔU« nehŒfŸ

thj« Ão¥ò, Fil¢rš, iffhby¿Î

Jiz kUªJ : btªÚ®

msÎ : 1 » Âd« _‹W ntis

cgnahf« : c£Ãunahf«

bt£ont® ijy«:

Mjhu üš : f©Qrhäa« gu«giu it¤Âa« - g¡f« v©.286

1. bt£ont® - 350 Gm
2. mÂkJu« - 17.2 Gm
3. fL¡fhŒ - 17.2 Gm

4. f°öçkŠrŸ - 17.2 Gm

5. nkho - 17.2 Gm

1. fL¡fhŒ

Botanical Name : Terminalia Chebula

Family : Combretaceae

Part used : Fruit

Rit : Jt®¥ò j‹ik : bt«ik ÃçÎ : Ïå¥ò

Fz«:

“jhil fG¤j¡» jhY F¿æ›a

Õil ÁègjKù ngÂKl« - Mil ba£lhj

öyäo ò©thj nrhâfh kiyæu©

lhyäo ngh« tç¡fh ahš”

Action : Stomachic, digestive, laxative, antioxidant

2. **bt£ont®:**

Botanical Name : Vetiveria zinzanoides

Family : Poaceae

Part used : Root

Rit: Ïå¥ò j‹ik : j£g« ÃçÎ : Ïå¥ò

Ã¤jé jhf« r»fh äy§fiw¥ Ã¤jkd‰

w¤ÂL F£lŠ ÁunehŒ fsko jhJe£l

k¤jk d‰ò© ld¥ò©t‹ _®¢ir tçéênehŒ

é¤Âu nkf¤Â‹ f£oÍ« ngh« bt£o ntçD¡nf - (m.F)

Action : Tonic, Antispasmodic, Febrifuge

3. **mÂkJu« :**

Botanical Name : Glycyrrhiza glabra

Family : Ranunculaceae

Part used : Root

Rit: Ïå¥ò j‹ik: Ój« ÃçÎ : Ïå¥ò

Fz« :

f¤jaç K¥Ãâahš tUò© jhf§

f©nzhŒ cŸ khj« é¡fš tèbt© F£l«

Ã¤jbkY« òU¡» »ç¢ru« Mt®¤j

Ã¤jkj _®¢ir élghf« bt¥g«

Action: Emollient, Demulcent, Tonic

4. nkho :

Botanical Name : Piper Longum

Family : Piperaccae

Rit: fh®¥ò j‹ik: bt¥g« ÃçÎ : fh®¥ò

Fz« :

jhfÃ¤jŠ nrhfªj jâah¢ RuäUkš

nkf§ Fu‰f«kš bkŒ¡fL¥ò« - VF§fh©

Â¥Ãè_ y§f©l¤ Â¥Ãèa jh« eW¡F¤

Â¥Ãèba‹ nwbahU¡h‰ br¥ò

Action : Stomachic

5. f°öç kŠrŸ :

Botanical Name : Curcuma aromatica

Family : zingiberaceae

Part used : Underground stem

Rit: if¥ò j‹ik: bt¥g« ÃçÎ : fh®¥ò

ò©Q§ fu¥ghD« nghfh¡ »UäfS«

e©Qkª jh¡»åÍ ehrkh« - t©zky®¤

bjh¤nj ‰sfä‹nd! R¡»yK« òÂÍkh§

f¤öç kŠrS¡F¡ fh© (m.F)

Action: Tonic, Stimulant, Carminative

brŒKiw:

bt£ontiu J©Lfshf eW¡» Ïo¤J gŠR nghš brŒJ xU FoÚ® gh©l¤Âš ngh£L 4 go j©Ù®é£L vç¤J 1/2 go R©od rka« tof£o, k‰w

ru¡Ffis ghšé£L miu¤J fy¡» ¾ go vŸë‹ beŒé£L gjKw fhŒ¢Á to¤J it¡fÎ«. thu« 1 Kiw °ehd« brŒa, if fhšfëš jlt nt©L«.

ÔU« éahÂ :

Õãr«, k©il¡Fil¢rš, njfvçÎ, iffhšfhªjš Kjèad.

* * * * *

CHEMICAL ANALYSIS OF HERBAL PREPARATION

Preparation of Extract

5 gm of kukilathy Choornam is weighed accurately and placed in a 250 ml clean beaker and added with 50 ml of distilled water. Then it is boiled well for about 10 minutes. Then it is cooled and filtered in a 100 ml volumetric flask and made upto 100 ml with distilled water.

S.No.	Experiment	Observation	Inference
1.	**1. Test for Acid Radicals.**		
	1. Test for sulphate		
a.	2 ml of the above prepared extract is taken in a test tube. To this add 2 ml of 4% Ammonium oxalate solution	White precipitate is obtained	Presence of sulphate
b.	2ml of Sodium carbonate extract is added with 2 ml of dilute Hydrochloric acid is until the effervescence ceases off. Then 2 ml of Barium Chloride solution is added.	A white precipitate unsoluble in concentrated Hydrochloric acid is obtained.	Sulphate is confirmed.
2.	**Test for Chloride :** 2 ml of Sodium carbonate extract is added with dilute Nitric acid till the effervescence ceases. Then 2 ml of Silver Nitrate Solution is added.	Cloudy white precipitate completely soluble increases of ammonium hydroxide solution obtained.	Presence of chloride
3.	**Test for Phosphate :** 2 ml of the extract is treated with 2 ml of Ammonium Molybdate solution and 2 ml of concentrated Nitric acid.	Absence of Yellow Precipitate	Absence of Phosphate
4.	**Test for carbonates :** 2 ml of the extract is treated with 2 ml of Magnesium sulphate solution.	Absence of White Precipitate	Absence of Carbonate

5.	**Test for Sulphide :** 1 gm of the substance is treated with 2 ml of concentrated Hydrochloric acid	Absence of Rotten egg smelling gas	Absence of Sulphide
6.	**Test for Nitrate :** 1 gm of the substance is heated with copper turnings and concentrated Sulphuric acid and viewed the test tube vertically down.	Absence of Reddish brown gas	Absence of Nitrate
7. a.	**Test for Fluoride and Oxalate :** 2 ml of the extract is added with 2 ml of dilute Acetic acid and 2 ml of Calcium Chloride Solution and heated.	Absence of White Precipitate	Absence of Fluoride and oxalate
b.	5 drops of clear solution is added with 2 ml of dilute Sulphuric acid and slightly warmed. To this, 1 ml of dilute Potassium permanganate solution is added.	Potassium Permanganate Solution is decolourised	Presence of oxalate
8.	**Test for Nitrite :** 3 drops of the extract is placed on a filter paper. On that, 2 drops of Acetic acid and 2 drops of Benezidine solutionis placed.	Absence of Yellowish colour	Absence of Nitrate
9.	**Test for Borate :** 2 pinches of the substance is made into paste by using sulphuric acid and Alcohol [95%] and introduced into the blue flame.	Absence of green tinged flame	Absence of Borate
10.	**Test for Basic Radicals :** **Test for Lead :** 2 ml of the extract is added with 2 ml of Potassium lodide solution	Absence of Yellow precipitate	Absence of Lead

11. a.	**Test for Copper :** One pinch of substance is made into paste with concentrated Hydrochloric acid in a watch glass and introduced into the nonluminous part of the flame.	Absence of bluish green, or bluish colour flame	Absence of copper
b.	2 ml of the extract is added with excess of Ammonia Solution	Absence of deep blue colour	Absence of copper
12.	**Test for Aluminium :** To the 2 ml of extract, Sodium hydroxide solution is added in drops to excess.	Absence of white precipitate	Absence of Aluminium
13. a.	**Test for Iron :** To the 2 ml of extract, 2 ml of Ammonium thiocyanate solution is added.	Absence of blood red colour	Absence of Ferric iron.
b.	To the 2 ml of extract, 2 ml of Ammonium thiocyanate solution and 2 ml of concentrated Nitric acid added.	Blood red colour is obtained	Presence of Ferrous Iron.
14	**Test for Zinc :** To the 2ml of extract Sodium hydroxide solution is added in drops to excess.	Absence of White Precipitate	Absence of Zinc.
15	**Test for Calcium :** 2 ml of the extract is added with 2 ml of 4% Ammonium Oxalate Solution.		
16.	**Test for Magnesium :** To 2ml of extract, Sodium hydroxide solution is added in drops to excess.	Absence of White precipitate	Absence of Magnesium
17.	**Test for Ammonium :'** To 2ml of extract few ml of Nessler's reagent and excess of Sodium Hydroxide solution are added.	Absence of Reddish Brown Precipitate	Absence of Ammonium.

18.	**Test for Potassium :** A pinch of substance is treated with 2 ml of sodium nitrite solution and then treated with 2 ml of Cobalitrate in 30% glacial Acetic acid.	Absence of Yellow colour flame	Absence of Potassium.
19.	**Test for Sodium :** 2 Pinches of the substance is made into paste by using Hydrochloric acid and introduced into the blue flame.	Absence of yellow colour flame.	Absence of sodium
20.	**Test for Mercury :** 2 ml of the extract is treated with 2 ml of Sodium Hydroxide solution.	Absence of yellow precipitate	Absence of mercury
21.	**Test for Arsenic :** 2 ml of extract is treated with 2 ml of Silver nitrate solution.	Absence of brownish red precipitate	Absence of Arsenic
III	**<u>Miscellaneous</u>**		
22	**Test for Starch :** 2 ml of extract is treated with weak Iodine solution	Blue or Violet Colour	Presence of Startch
23.	**Test for reducing sugar :** 5 ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and added 8 to 10 drops of the extract and again boiled for 2 minutes. The colour changes are noted.	No colour changes obtained	Absence of reducing sugar.
25. a.	**Test for alkaloids :** 2 ml of the extract is treated with 2 ml of Potassium iodide solution	Absence of red colour	Presence of alkaloids
b.	2 ml of extract is treated with 2 ml of Picric acid	Yellow Colour develops	Presence of alkaloids
c.	2 ml of the extract is treated with 2 ml of Phosphotungstic acid	Absence of white precipitate	

26	**Test for Tannic acid :** 2 ml of the extract is treated with 2 ml of Ferric chloride solution	Presence of Black precipitate	Presence of unsaturated compound.
27.	**Test for unsaturated compound** To 2 ml of the extract 2 ml of Potassium Permanganate solution is added.	Pottssium Permanganate is decolourised	Presence of unsaturated compound.
28.	**Test for Aminoacid :** 2 drops of the extract is placed on a filter paper and dried well. After drying 1% Ninhydrine is sprayed over the same and dried well.	Absence of Violet colour	Absence of Aminoacid
29	**Test for Albumin :** 2ml of the extract is added with 2ml of Esboch's reagent	Absence of Yellowish Precipitate	Absence of Albumin
30	**Test for Type of compound :** 2 ml of the extract is treated with 2 ml of Ferric Chloride solution.	Absence of Red Colour	--

Results :

The given sample contains

1. ACID RADICALS : Sulphate, Chloride, Oxalate
2. BASIC RADICALS : Ferrousiron
3. MISCELLANEOUS : Starch., alkaloids, unsaturated compound.

MICROBIOLOGICAL ANALYSIS

Preparation of Extract :

To 5gms of drug 50 ml of water was added and kept in a boiling water bath for 20 minutes and then filtered.

The extract of the drug was tested with the following micro – organisms

1. Staphylococcus aureus
2. Escherichia coli
3. Klebsiella
4. proteus
5. Psuedomonas
6. Candida Albicans

The tube dilution method was used as a homogenous dispersion of the drug is more effective to test the anti microbial activity of the drug. Dilution method is used in the preliminary screening of the anti – microbial activity.

To 5ml of nutrient broth culture 0.5 ml of the extract was added and the tubes were incubated at 31^0C over night. The next day the tubes were examined for turbidity and subcultures were made on nutrient agar plates. Control tubes without drug were also incubated.

The plates were incubated over night at 370C and the next day reading was taken.

I. Kukilathy choornam :

Staphylococcus aureus	-	Not Sensitive
Escherichia coli	-	Not Sensitive
Klebsiella	-	Not Sensitive
Proteis	-	Not Sensitive
Pseudomonas aeruginosa	-	Not Sensitive
Candida albicans	-	Not Sensitive

ACUTE TOXICITY STUDY

TOXICOLOGICAL EVALUATION FOR KUKKILATHY CHOORNAM:
Acute oral toxicity study [Ecobichnon 1997]

The procedure was followed by using OECD guidelines [Organization of Economic Cooperation and Development] 423 [Acute Toxic Class Method]. The acute toxic class method is a stepwise procedure with 3 small animals of a single sex per step. Depending on the mortality and or morbidity status of the animals, on the average 2 – 4 steps may be necessary to allow judgment on the acute toxicity of the test substance. This procedure results in the use of a minimal number of animals while allowing for acceptable data based scientific conclusion. The method, uses defined doses 2000 mg / kg body weight. The results allow a substance to be ranked and classified according to the Globally Harmonized System [GHS] for the classification of chemicals which cause acute toxicity.

Experimental procedure :

Female Wister rats weighing 150 – 200 gram were used for the study. The starting dose level of kukilathy chooranam was 2000 mg / kg body weight per oral. As most of the crude extracts possess LD 50 value more than 2000 mg / kg per oral [P.O] the starting dose used was 2000 mg / kg P.O. Dose volume was administered 0.1 ml / 10 gm body weight to the rat which were fasted night over with water ad libitum. Food was withheld for a further 3 – 4 hours after administration and observed for signs of toxicity. Body weights of the rats before and after termination were noted and any changes in skin and fur, eyes and mucous membranes and also respiratory, circulatory, autonomic and central nervous systems and somatomotor activity and behaviour pattern were observed, and also signs of tremors, convulsion, Salivation, diarrhoea, lethargy, Sleep and coma were noted.

Results :

The trial drug kukilathy choornam did not exhibit any significant toxicity at 2000 mg / kg body weight. So the drug is safe for long term administration.

ANTI – INFLAMATORY EVALUATION OF KUKILATHY CHOORANAM BY CARAGEENAN INDUCED PAW OEDEMA METHOD

Drug	60 min	120 min	180 min	240 min
Group I	0.29 ± 0.13	0.36 ± 0.01	0.51 ± 0.01	0.50 ± 0.06
Group II	0.18 ± 0.01	0.20 ± 0.02	0.30 ± 0.02	0.33 ± 0.01
Group III	0.16 ± 0.05	0.17 ± 0.08	0.14 ± 0.04	0.16 ± 0.08

Values expressed as mean ± S.D of 6 animals in each group.

Comparison were made between Group I, II & III.

G * P $\leq$ 0.05

Experimental protocol :

Animals : Wister Rat

Sex : Both

Weight Range : 160 – 200 gm

Number in each group : 6

Group I - Control animals received Tween – 20 orally at the dose of 10ml / kg b.W

Group II - Animals received kukilathy chooranam 180 mg orally / K.g. body weight.

Group III - Animals received standard drug Diclofenac sodium orally at the dose of 5 mg / kg body weight.

PROCEDURE :

The paw edema, was induced by injection of 0.1 ml of 1.1% carrageenan in 09% saline into sub plantar region of the left hind paw of the rats. The EEAI standard [Diclofenac 50mg/kg] and control [Tween 20] were administered 60 minutes before carrageenan an injection. The volume of injected paw was measured at 1^{st}, 3^{rd}, 5^{th} hours after the carrageenan injection using a plethysmometer and the edema was expressed by increase in paw volume.

Result:

The trial drug **Kukilathy choornam** exhibit **Anti inflammatory activity.**

Reference :

Winter [C Rislef EA NUSS G.W. 1962 Carrageenan induced in hind paw of the rats as an assay for anti inflammatory drug.

ANALGESIC EVALUATION OF KUKILATHY CHOORANAM BY ACETIC ACID INDUCED WRITHING METHOD.

Drug / Dose	Number of Writhing in 20 Minutes
Group I	42.5 ± 2.59
Group II	19.58 ± 3.43 *
Group III	13.5 ± 2.47

Value expressed as mean ± S.D of animals in each group. Comparison were made between Group I II & III $P < 0.05$

Experimental Protocol

Animal : Allbino Mice

Sex : Both

Weight Range : 20 to 25 gm

Number in each group- 6

Group I - Control animals received Tween – 20 orally at the dose of 10 ml/kg b.w

Group II - Animals received kukilathy choornam orally at the dose of 260 mg / kg b.w.

Group III - Animals received standard drug aspirin orally at the dose of 100 mg/kg b.w.

ACETIC ACID INDUCED WRITHING METHOD

PROCEDURE:

Painful reaction in animals produced by chemical method by using .6% V/V acetic acid injecting 1ml / 100 gm body wt of the animal. Animals divided into 3 group each consisting of 6 were administered the appropriate volume of acetic acid solution to the first group animal. Place them individually under glass jar for observation. Note the onset of writhing. Record the number of abdominal contractions, trunk twisting response during a period of 10 min. The second and third group animal administered the test drug. After 1 hr later administer the acetic acid to all the animals. Note the onset and severity of writhing response as mentioned above. The calculage the mean writhing response in control as well as drug treated animals.

Reference:

Kulkarni S.K. Hand book of Experimental Pharmacology. 3rd Edition, Vallabh Prakash, New Delhi 1999.

ANALGESTIC ACTION BY TAIL IMMERSION METHOD:

In this method heat is used as a source of pain. The basal reaction time by observing in mice when immersed the tail on the hot water maintained at constast temperature (55^0C). The tail withdrawal response is taken as the end point. Analgesics increase the reaction time after the drug administration different time interval (60, 120, 180, 240 minutes) observed the tail withdrawal response of all the group of animals. A cut off period of 15 sec is observed to avoid damage to the tail. Then calculate the reaction time at each time interval.

Group	60 minutes	120 minutes	180 minutes
Group I	2.85 ± 0.75	2.83 ± 0.75	3.00 ± 0.89
Group II	5.7 ± 1.16	6.8 ± 2.85	7.12 ± 1.47
Group III	9.66 ± 1.36	9.5 + 1.87	9.26 ± 1.72

Values expressed as mean ± S.D. of 6 animals in each group.

Comparision were made between Group I, Vs Group. II and III $p < 0.05$.

Experimental protocol

Animal :Albino mice

Sex : Both

Weight range : 20 to 25 gm

Number in each group – 6.

Group I - Control animals received *tween – 20* orally at the dose of 10 ml/kg b.w.

Group II – Animals received *Kukilathy Choornam* orally at the dose of 260 mg / kg b.w.

Group III – Animals received standard drug Aspirin orally at the dose of 5 mg mg/ k.g. b.w.

Result:

Kukilathy Choornam at the dose of 260 mg administered orally the animals exhibited significant ($p < 0.05$) analgesic activity when compared with control animals. The standard drug also exhibited significant analgesic activity.

CASE SHEET PROFORMA

IP CASE SHEET PROFORMA FOR "VADHA KARSANAM" GOVT SIDDHA MEDICAL COLLEGE & HOSPITAL POST GRADUATE DEPARTMENT, BRANCH I - MARUTHUVAM POTHU CHENNAI – 106

IP NO :

WARD NO :

BED NO :

NAME :

AGE :

SEX :

ADDRESS :

EDUCATION:

OCCUPATION

INCOME

NATIONALITY

RELIGION

DATE OF ADMISSION

DATE OF DISCHARGE

TOTAL NO OF DAYS TREATED

RESULTS
DIAGNOSIS

MEDICAL OFFICER'S SIGNATURE

1. COMPLAINTS AND DURATION :
2. H/O PRESENT ILLNESS:
3. H/O PREVIOUS ILLNESS:
4. PERSONAL HISTORY INCLUDING HABITS:
5. FAMILY HISTORY:
6. OBSTETRIC HISTORY:

GENERAL EXAMINATION:

1. Consciousness
2. Nutrition
3. Decubitus
4. Anaemia
5. Jaundice
6. Cyanosis
7. Clubbing
8. JVP
9. Oedema
10. Generalised Lymphadenopathy
11. Pulse Rate
12. Heart Rate
13. Respiratory Rate
14. Temperature
15. Blood Pressure

SIDDHA ASPECT

NILAM (Places)

Kurinji (Hilly area)
Mullai (Forest area)
Marutham (Fertile area)
Neithal (Coastal area)
Palai (Arid area)

PARUVA KAALAM (Seasons)

1. Kaar (Aavani – Purattasi) –(Aug-Oct)
2. Koothir (Iyppasi – Karthigai) – (Oct-Dec)
3. Munpani (Maargazhi – Thai) – (Dec-Feb)
4. Pinpani (Maasi – Panguni) – (Feb – Apr)
5. Elavenil (Chithirai – Vaigasi) – (Apr – June)
6. Muthuvenil (Aani – Aadi) – (June – Aug)

YAKKAI (UDAL NILAI)

Vatham
Pitham
Kapham
Kalappu

MUKKUNAM

Sathuva gunam
Raasatha Gunam
Thamasa Gunam

IYMPORI/PULANGAL (Sensory Organs)

Mei / Sensation
Vaai / Taste
Kan / Vision

Mooku / Smell
Sevi / Hearing

KANMENTHIRIYAM / KANMAVIDAYAM:

Kai – Koduththal
Kaal – Nadaththal
Vai-Pesal
Eruvai-Kazhiththal
Karuvai-Ananthithal

MUMMALAM:

Malam
Moothiram
Viyarvai

KOSAM

1. Annamaya Kosam (Paru udambu) (Yeluudal Thaathukkal)
2. Pranamaya Kosam (Vali udambu) (Pranan + Kanmenthiriyam)
3. Manomaya Kosam (Mana udambu) (Manam + Gnanenthiriyam)
4. Gnanamaya Kosam (Arivu udambu) (Puththi + Gnanenthiriyam)
5. Ananthamaya Kosam (Inba Udambu) (Pranan + Suzhuthi)

PIRA URUPPUKALIN NILAI:

Iruthayam
Puppusam
Eraippai
Kalleeral
Manneeral
Siruneeragam
Siruneerpai
Moolai
Karuppai

UYIR THATHUKKAL:

VALI (or) VATHAM:

Piranan
Abanan
Viyanan
Uthanan
Samanan
Nagan
Koorman
Kirukaran
Devathathan
Thanajayan

AZHAL (or) PITHAM

Analagam
Ranjagam

Saadhagam
Aalosagam
Prasagam

IYAM (or) KAPHAM:

Avalambagam
Kilethagam
Pothagam
Tharpagam
Santhigam

UDAL THATHUKKAL:

Saaram
Senneer
Oon
Kozhuppu
Enbu
Moolai
Sukkilam/Suronitham

ENVAGAI THERVUGAL:

Naa
Niram
Mozhi
Vizhi
Sparisam
Malam
- Niram
- Edai
- Erugal
- Elagal

Moothiram

I Neerkuri
- Niram
- Manam
- Edai
- Nurai
- Enjal

II Neikuri
- Vatha neer
- Pitha neer
- Kapha neer
- Thontha neer

Naadi
- Vatha Naadi
- Pitha Naadi
- Kapha Naadi
- Thontha Naadi

MODERN ASPECT

Higher Intellectual Functions:

Consciousness

Intelligence

Behaviour

Memory

Orientation

Speech

Handedness

Cranial Nerves:

1. Olfactory Nerve
2. Optic Nerve
3. Oculomotor Nerve
4. Trochlear Nerve
5. Trigeminal Nerve
6. Abducent Nerve
7. Facial Nerve
8. Vestibulo Cochlear Nerve
9. Glosso Pharyngeal Nerve
10. Vagus Nerve
11. Accessory Nerve
12. Hypoglossal Nerve

Motor System:

Nutrition:	**Right**	**Left**
Thigh Muscles		
Leg Muscles (Calf)		
Power	**Right**	**Left**
Muscles of the Lower Limb		
Dorsi / Plantor flexion of the foot		
Extensors of the knee		
Flexors of the knee		

Extensors of the thigh

Flexors of the thigh

Abductors of the thigh

Adductors of the thigh

Rotators of the thigh

Tone	**Right**	**Left**
Hip		
Knee		
Ankle		
Toe		

Fasiculation	**Presence**	**Absence**

Reflex

Superficial	Right	Left
1. Plantar		
Deep		
Biceps		
Triceps		
Supinator		
Knee		
Ankle		

Sensory System

Touch		
Pain		
Temperature		
Position Sense		
Vibration		
Stereognosis		

Gait

Co-ordination	**Right**	**Left**

Finger - Nose

Finger Nose Finger

Knee – Heel

Rombergs Sign

Dysdiadokinensia

Involuntary Movements

Investigations:

Blood

- TC
- DC
- ESR
- HB
- SUGAR (F/PP/R)
- VDRL

Urea

Cholesterol

CSF

Serum Creatinine

Liver Function Test

Serum Protein

Peripheral Smear for Cytology

PERIPHERAL BLOOD SMEAR

- PCV
- MCV
- MCH
- MCHC

ELECTRO DIAGNOSIS

- Electro Myography
- Nerve Conduction Study
- Nerve Biopsy

MOTION

Ova

Cyst

Occult Blood

URINE

Albumin

Sugar

Deposit

SIGNS & SYMPTOMS

S.NO	CLINICAL FEATURES	1St DAY	8th DAY	16th Day	24th Day	32th Day	40th Day	48th Day
1.	PALLOR							
2.	DRYSKIN							
3.	FORMICATION							
4.	BURNING SENSATION (SOLES/LEGS)							
5.	DRYNESS TO TONGUE							
6.	DIFFICULT TO WALK							
7.	HEAVINESS OF THE BOY							
8.	CONSTIPTION							
9.	PRICKING SENSATION							
10.	NUMBNESS							
11.	DISTAL MUSCLE WEAKNESS							
12.	CALF MUSCLE TENDERNESS							
13.	REFLEX							
14.	POLYURIA,POLYDYPSIA,POLYPHAGIA							
15.	MALAISE							
16.	PALPITATION							
17.	COLICKY ABDOMINAL PAIN							

+++ Severe ++ Moderate + Mild- Nil

Case Summary

Final Diagnosis

Drug

Medical advice

RESULTS & OBSERVATIONS

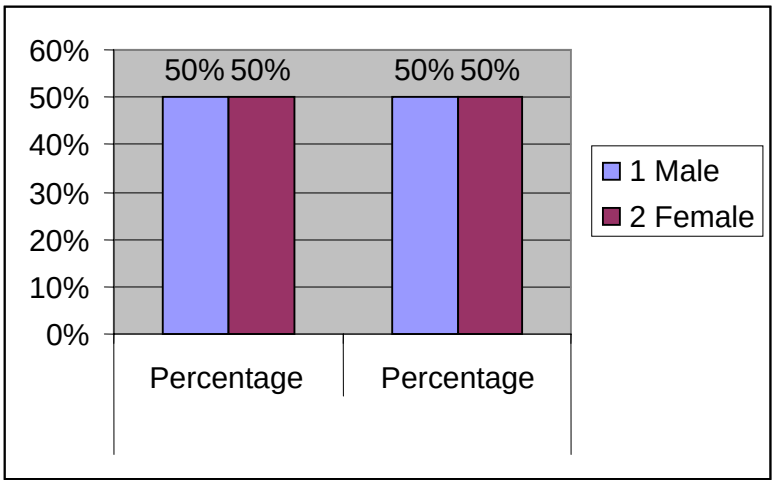
A total of 40 patients with Predominant symptoms of Vadha Karsanam, attending the O.P & I.P Maruthuvam Department, GSMC attached to Arignar Anna Hospital was studied by me. Each among them 20 patients were treated as out patients and other 20 was treated as in patients. Among them 20 cases were affected due to Diabetes Mellitus and other 20 cases were due to Nutritional deficiency.

Observations were made by the following features:

1. Gender distribution
2. Age distribution .
3. Occupational distribution
4. Religious distribution
5. Diet
6. Personal habits
7. Socio – economic status
8. Thinai Reference
9. Kaalam Reference
10. Seasonal Reference
11. Duration of illness
12. Reference to Mukkutram
    a. Vali
    b. Azhal
    c. Iyam
13. Udal Kattugal
14. Envagai Thervugal
15. Neikuri Reference
16. Predisposing factors and associated diseases
17. Signs & Symptoms during admission and discharge
18. Assessment of Results

1. GENDER DISTRIBUTION

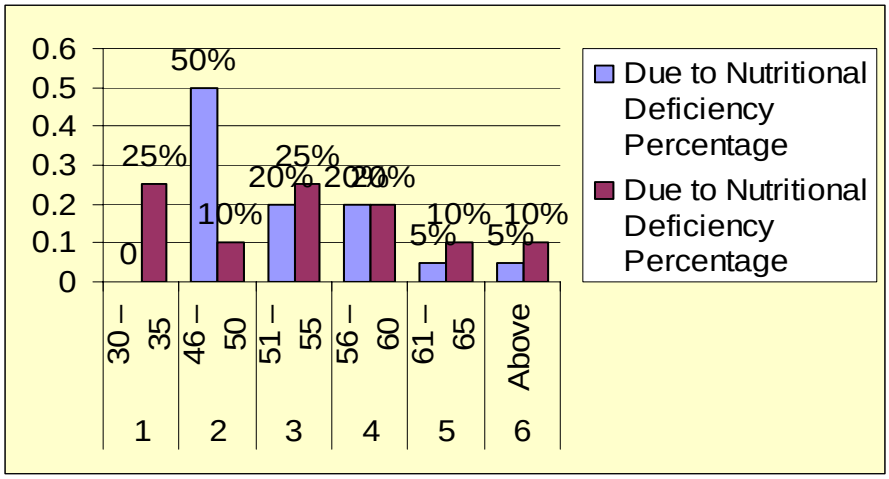
S.No	Gender	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
1.	Male	No of cases	Percentage	No of cases	Percentage
		10	50%	10	50%
2.	Female	10	50 %	10	50%



Both females and males are affected equally.

2. INCIDENCE OF AGE

S.No	Age in Years	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	30 – 35	-	-	5	25%
2.	46 – 50	10	50 %	2	10 %
3.	51 – 55	4	20 %	5	25 %
4.	56 – 60	4	20 %	4	20 %
5.	61 – 65	1	5 %	2	10 %
6.	Above	1	5 %	2	10 %



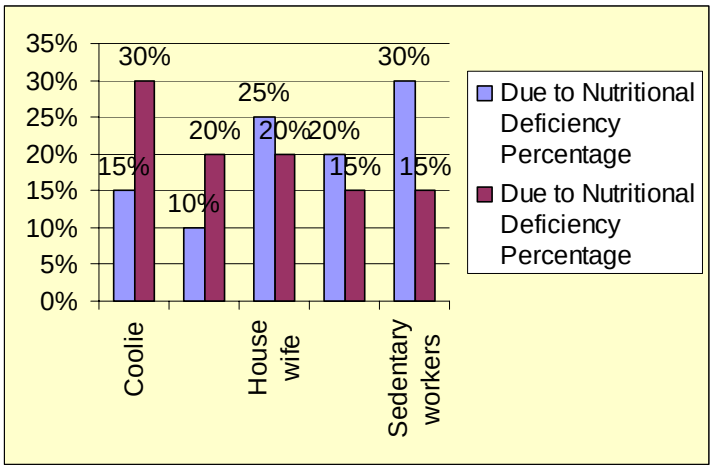
Due to Diabetes Mellitus and Nutritional deficiency among 20 cases the incidence of age 40 to 65 years.

3. RELIGIOUS DISTRIBUTION

S.No	Religion	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	**Hindu**	15	75 %	16	80 %
2.	**Muslim**	2	10 %	-	-
3.	**Christian**	3	15 %	4	20 %

4. OCCUPATIONAL DISTRIBUTION

S.No	Nature of work	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Coolie	3	15 %	6	30 %
2,	Driver	2	10 %	4	20 %
3.	House wife	5	25 %	4	20 %
4.	Watchman	4	20 %	3	15 %
5.	Sedentary workers	6	30 %	3	15 %



Due to Diabetes Mellitus :

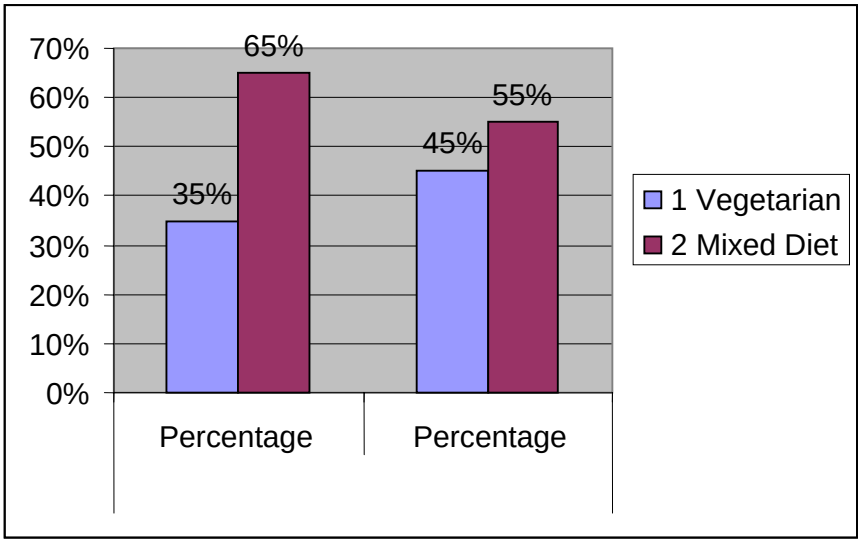
30% of sedentary workers 20% of House wife were of symptoms due to diabetes mellitus.

Due To Nutritional Deficiency:

30% of coolie & 20% of house wife's were of symptoms due to Nutritional deficiency.

5. DIET

S.No	Food Habits	Due to Diabetes Mellitus (20)		Due to Nutritional Deficiency (20)	
		No of cases	Percentage	No of cases	Percentage
1.	Vegetarian	7	35%	9	45 %
2.	Mixed Diet	13	65%	11	55 %

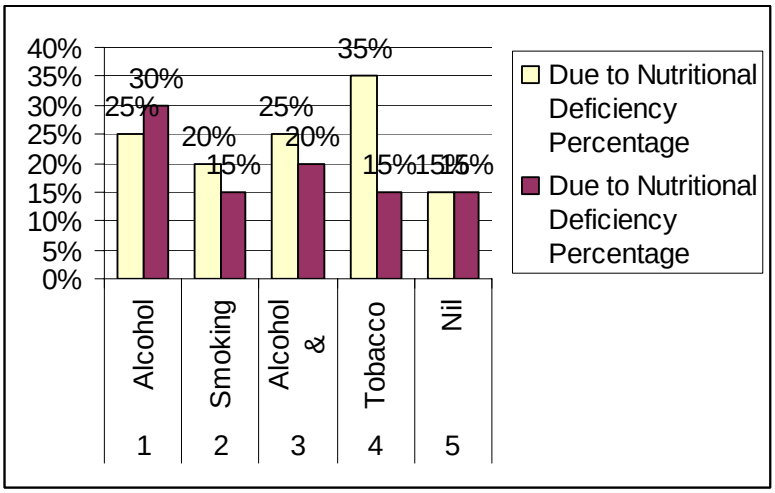


Due to Diabetes Mellitus – Out of 20 cases – 65% all mixed Diet.

Due to Nutritional Deficiency – Out of 20 cases 45% are Vegetarian.

6. PERSONAL HABITS

S.No	Habits	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Alcohol	5	25 %	6	30 %
2.	Smoking	4	20 %	3	15 %
3.	Alcohol & smoking	5	25 %	4	20 %
4.	Tobacco	7	35 %	3	15 %
5.	Nil	3	15 %	3	15 %

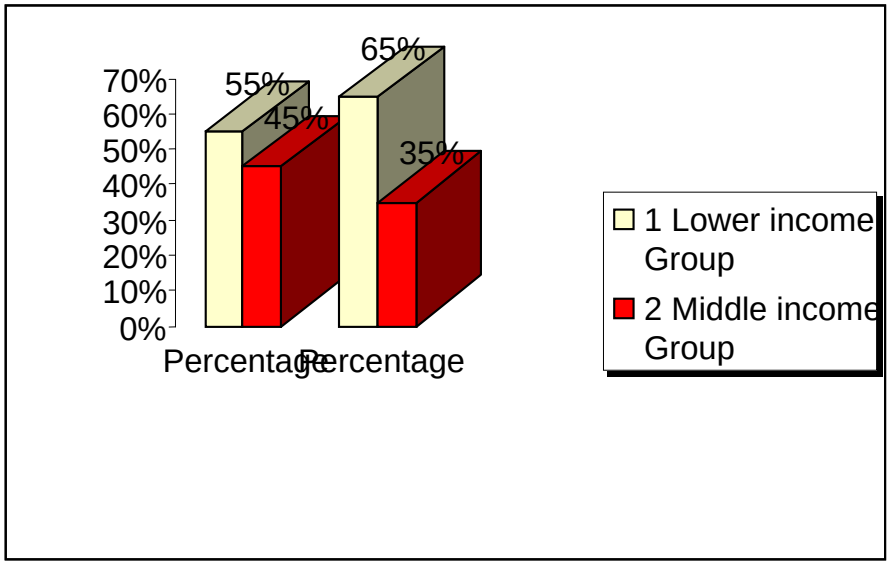


Due to DM – 35% of patient of alcoholic habit

Due to ND – 20% had alcoholic habit

7. SOCIO ECONOMIC STATUS

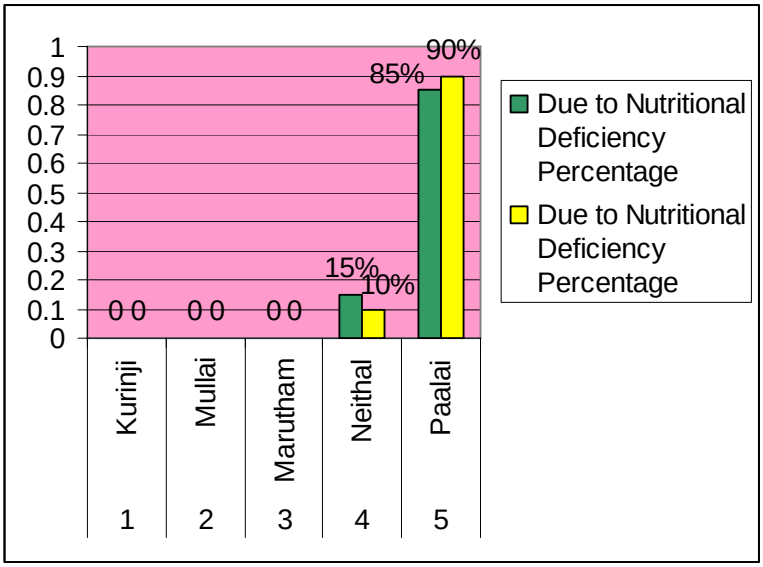
S.No	Socio Economic Status	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Lower income Group	11	55 %	13	65 %
2.	Middle income Group	9	45 %	7	35 %



Most of the patients belonged to lower income group.

8. THINAI REFERENCE

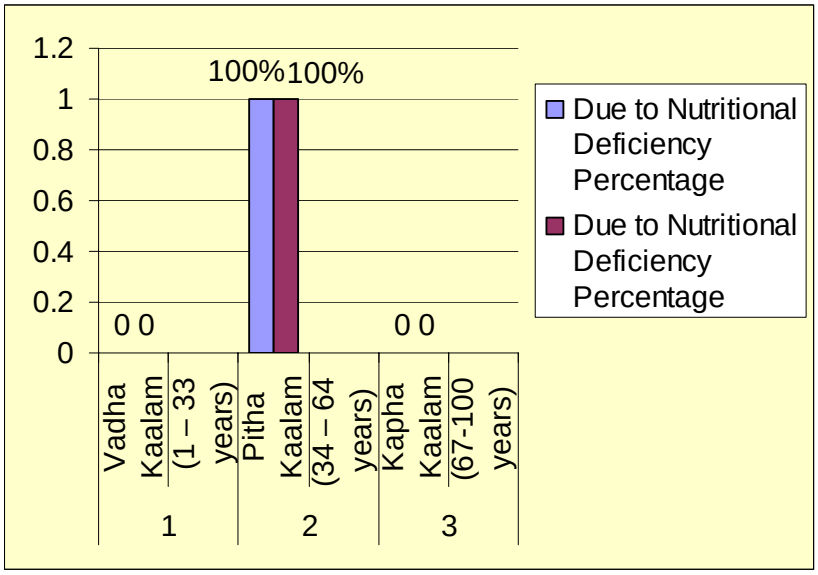
S.No	Nature of work	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Kurinji	0	0	0	0
2.	Mullai	0	0	0	0
3.	Marutham	0	0	0	0
4.	Neithal	3	15 %	2	10 %
5.	Paalai	17	85 %	18	90 %



Most of the patients were from Neithal Nilam

9. KAALAM REFERENCE

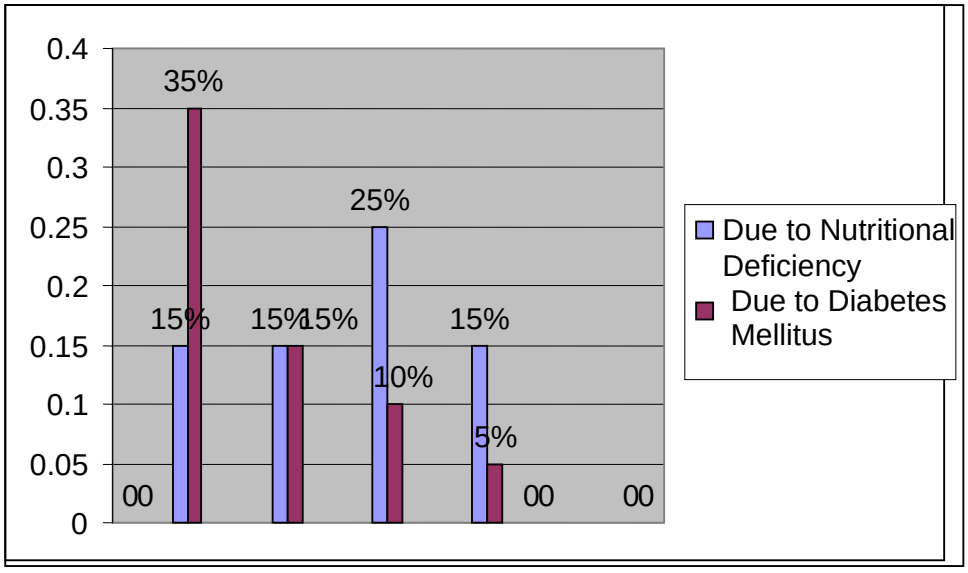
S.No	Kaalam	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Vadha Kaalam (1 – 33 years)	0	0	0	0
2	Pitha Kaalam (34 – 64 years)	20	100 %	20	100 %
3.	Kapha Kaalam (67-100 years)	0	0	0	0



All patients were is Pitha Kaalam

10. SEASONAL REFERENCE

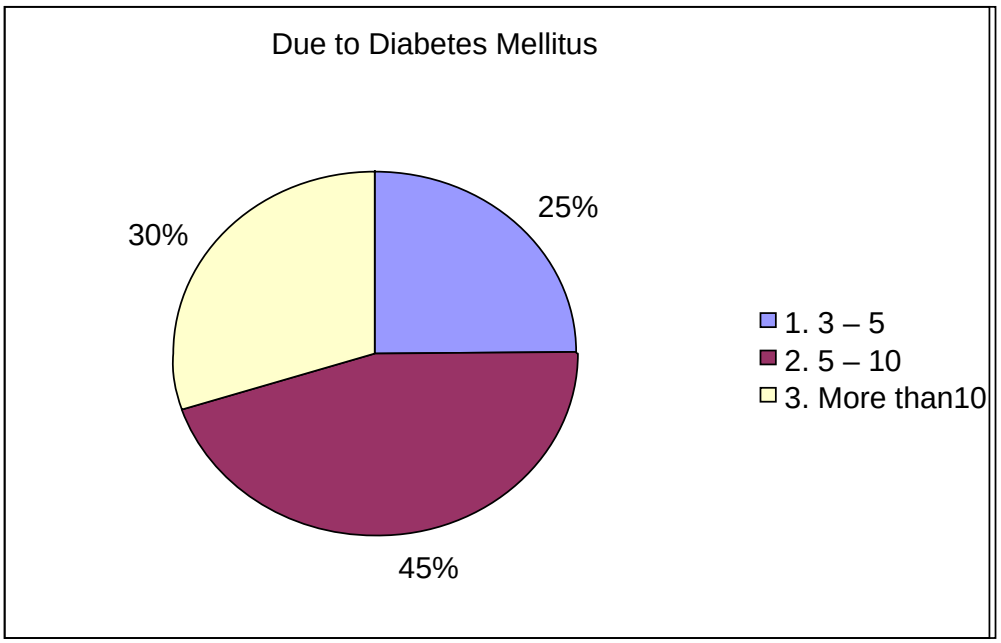
S.No	Paruva Kaalam	Months	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
			No of cases	Percentage	No of cases	Percentage
1.	Kaar Kaalam (Avani, Puratasi)	Aug, Sep, Oct	3	15 %	7	35 %
2.	Koothir Kaalam (Iypasi, Karthigai)	Oct, Nov, Dec	3	15 %	3	15 %
3.	Munpani Kaalam (Markazhi, Thai)	Dec, Jan, Feb	5	25 %	2	10 %
4.	Pinpani Kaalam	Feb, Mar, Apr	3	15 %	1	5 %
5.	ElavnilKaalam (Chithirai, Vaikasi)	Apr, Mar, June	0	0	0	0
6.	Muthuvenil Kaalam (Aani, Aadi)	June, July. Aug	0	0	0	0



Most of the patients were affected in Munpani, Kaarkaalam.

11(A). DURATION OF ILLNESS

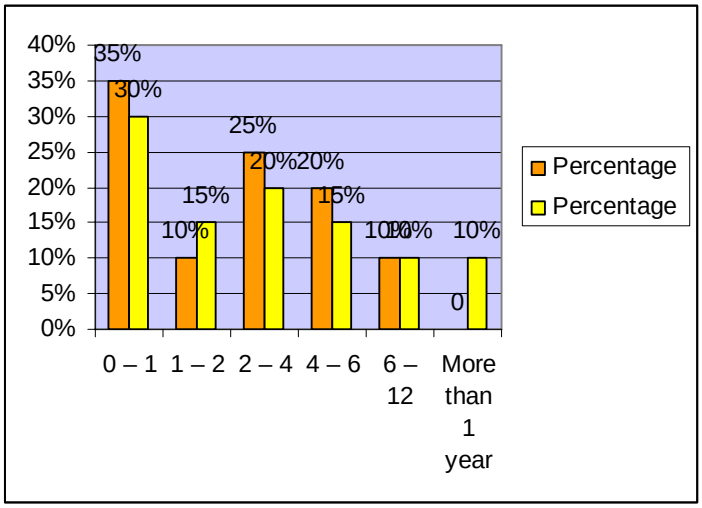
S.No	Duration of Diabetes Mellitus	No of cases	Percentage
1.	3 – 5	5	25 %
2.	5 – 10	9	45 %
3.	More than 10	6	30 %



45% of cases had 5 – 10 Years duration.

11(B). DURATION OF ILLNESS:-

S.No	Duration of illness in months	Due to Diabetes Mellitus		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1	0 – 1	7	35 %	6	30 %
2	1 – 2	2	10 %	3	15 %
3	2 – 4	5	25 %	4	20 %
4	4 – 6	4	20 %	3	15 %
5	6 – 12	2	10 %	2	10 %
6	More than 1 year	-	-	2	10 %



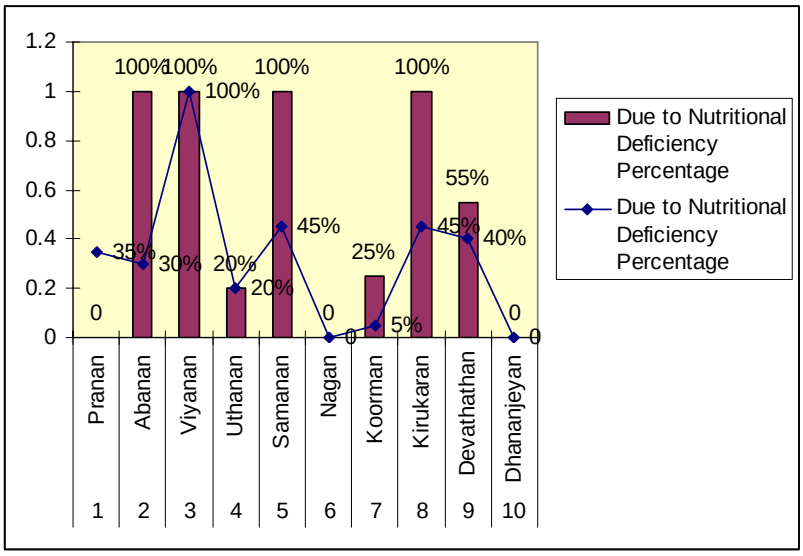
Due to Diabetes Mellitus – 35% cases had less than 1 month duration . 25% of cases had 2 to 4 months duration

In Nutritional deficiency – 30% of cases had less than 1month & 20% had 2-4 months duration

12.INCIDENCE ACCORDING TO MUKKUTRAM

A. VADHAM:

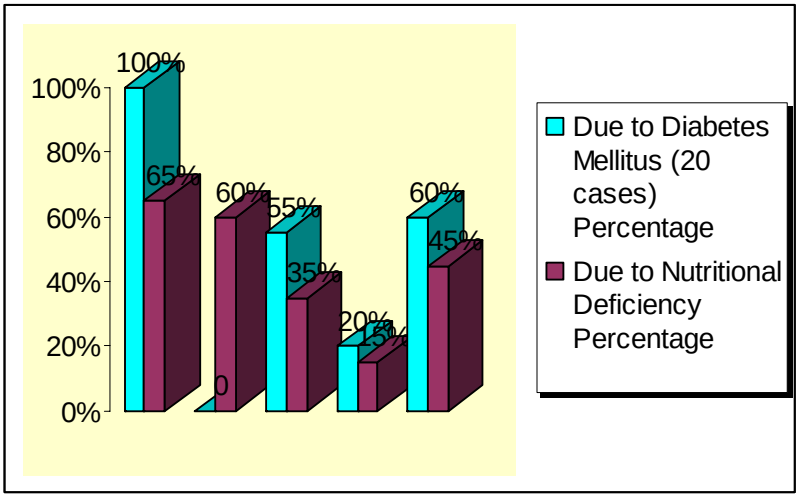
S.No	Types of Vadham	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Pranan	-	-	7	35 %
2.	Abanan	20	100 %	6	30 %
3.	Viyanan	20	100 %	20	100 %
4.	Uthanan	2	20 %	4	20 %
5.	Samanan	20	100 %	9	45 %
6.	Nagan	-	-	-	-
7.	Koorman	5	25 %	1	5 %
8.	Kirukaran	20	100 %	9	45 %
9.	Devathathan	11	55 %	8	40 %
10.	Dhananjeyan	-	-	-	-



Due to Diabetes Mellitus – Abanan, Samanan & Kirukaran were affected in 100% of Patients. In Nutritional deficiency – Viyanan was affected in 100% of patients.

B. PITHAM:

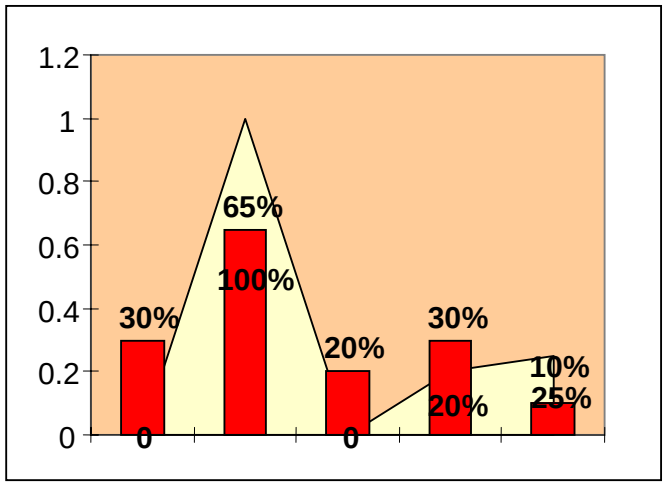
S.No	Types of Pitham	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Anar Pitham	20	100 %	13	65 %
2.	Ranjaga Pitham	-	-	2	60 %
3.	Prasaga Pitham	11	55 %	7	35 %
4.	Alosaga Pitham	4	20 %	3	15 %
5.	Sathaga Pitham	12	60 %	9	45 %



Due to Diabetes Mellitus Anar Pitham is affected in 100% of patients In Nutritional deficiency 65% of Anar Pitham and 60% Ranjaga Pitham is affected.

C. KAPHAM:

S.No	Types of Kapham	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Avalambagam	-	-	6	30 %
2.	Kilethagam	20	100 %	13	65 %
3.	Pothagam	-	-	4	20 %
4.	Tharpagam	4	20 %	6	30 %
5.	Santhigam	5	25 %	2	10 %

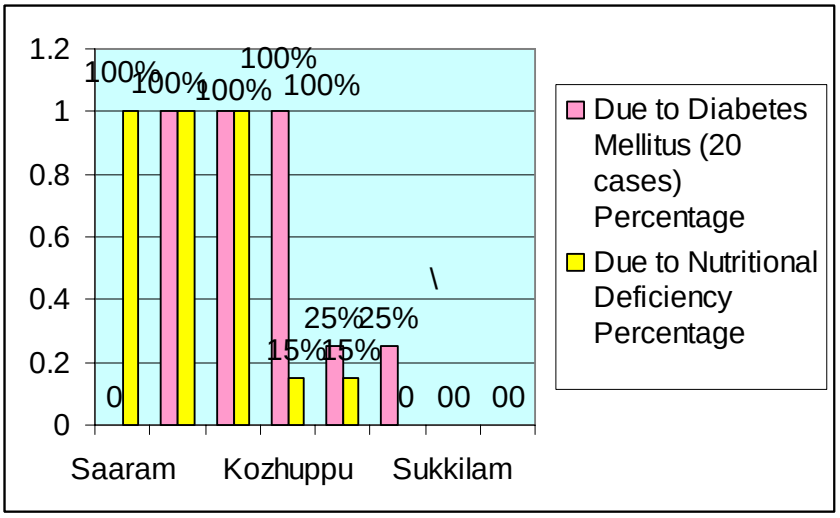


Due to Diabetes Mellitus – 100% of Kilethagam 20% Tharpagam, 25% Santhigam was affected.

Due to Nutritional deficiency 30% of Avalambagam, 65% of Kilethagam, 20% Pothagam, 30% of Tharpagam and 10% Santhigam was affected.

13. EZHU UDAL KATTUGAL

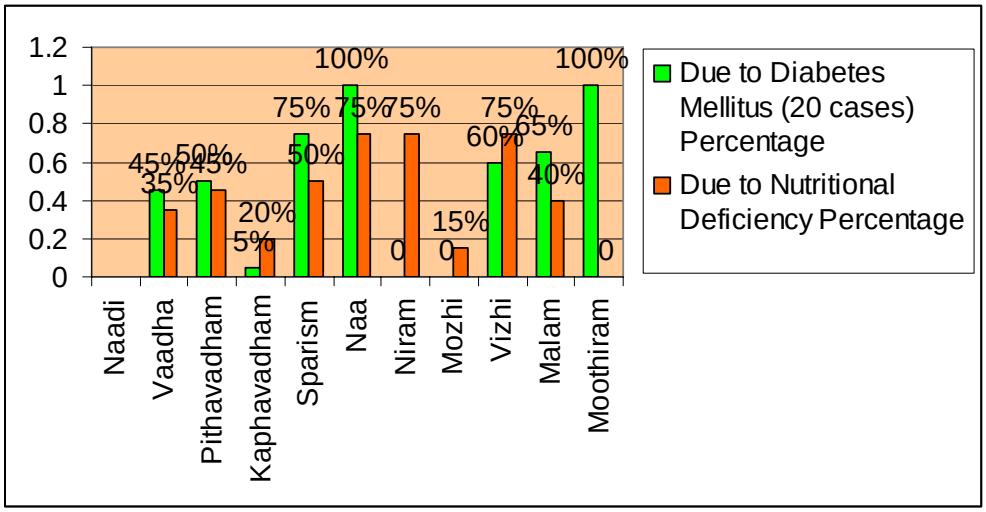
S.No	Udal Kattugal	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Saaram	20	0	20	100 %
2.	Seneer	20	100 %	20	100 %
3.	Oon	20	100 %	20	100 %
4.	Kozhuppu	5	100 %	3	15 %
5.	Enbu	5	25 %	3	15 %
6.	Moolai	0	25 %	0	0
7.	Sukkilam	0	0	0	0
8.	Suronitham	0	0	0	0



Saaram, Seneer, Oon (in diminished state) were affected in 100% cases.

14. ENVAGAI THERVUGAL:-

S.No	Ennvagai Thervugal	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Naadi Vaadha Pitham Pithavadham Kaphavadham	 9 10 1	 45 % 50 % 5 %	 7 9 4	 35 % 45 % 20 %
2.	Sparism	15	75 %	10	50 %
3.	Naa	20	100 %	15	75 %
4.	Niram	0	0	15	75 %
5.	Mozhi	0	0	3	15 %
6.	Vizhi	12	60 %	15	75 %
7.	Malam	13	65 %	8	40 %
8.	Moothiram	20	100 %	0	0

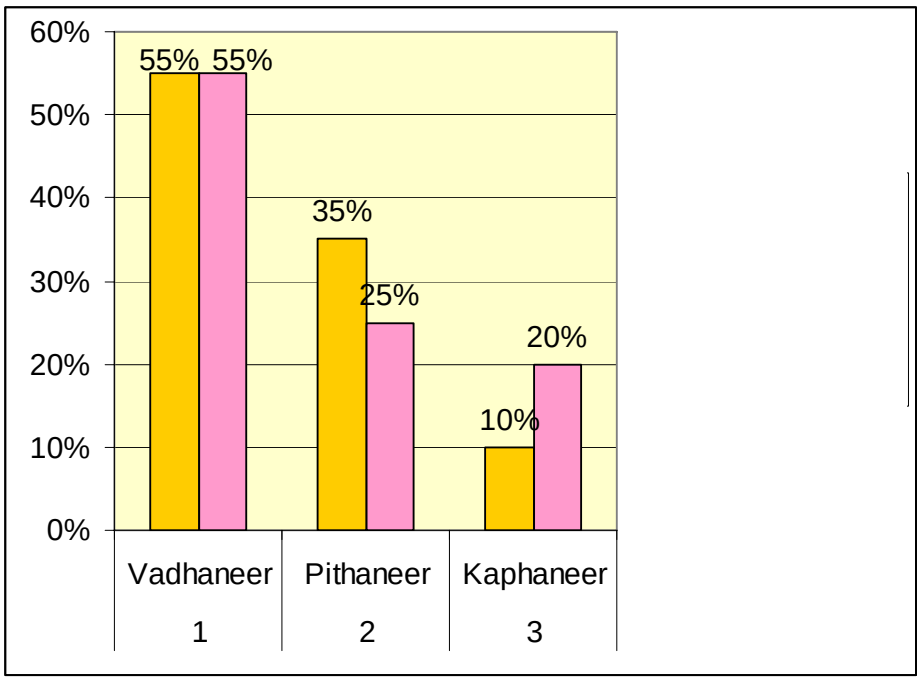


Due to diabetes Mellitus – Naa and Moothiram were affected in 100% of Cases.

Due to Nutritional deficiency – Naa, Niram and vizhi is affected in 75% of cases.

15. NEIKURI

S.No	Neikuri	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Vadhaneer	11	55 %	11	55 %
2.	Pithaneer	7	35 %	5	25 %
3.	Kaphaneer	2	10 %	4	20 %



Due to diabetes Mellitus vadha Neer in 55%

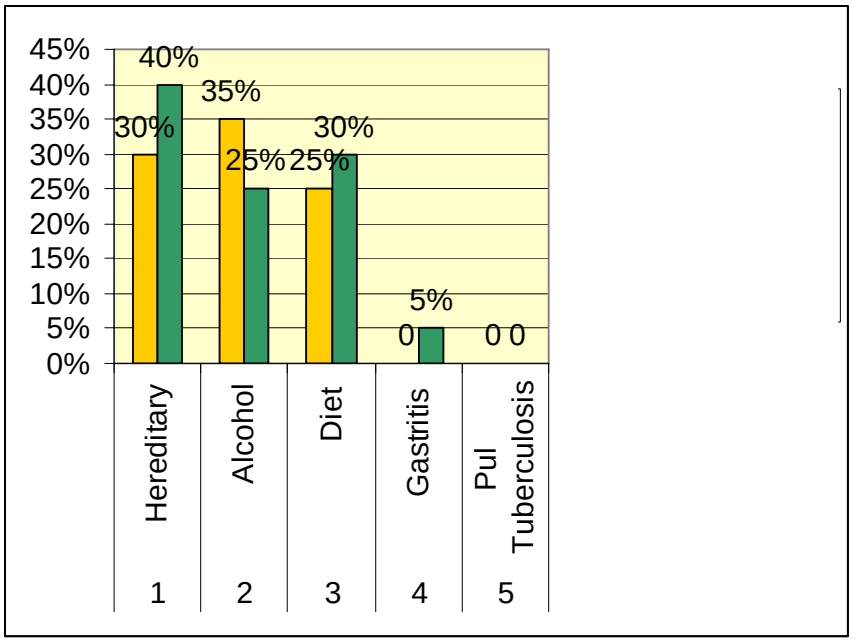
Azhal Neer in 25%, Kabha neer in 10 %

Due to Nutritional Deficiency:

Vadha Neer in 55%, Azhal Neer in 25%, Kabha Neer in 20%

16. PREDISPOSING FACTORS & ASSOCIATED DISEASES:-

S.No	P.D.F & Associated Diseases	Due to Diabetes Mellitus (20 cases)		Due to Nutritional Deficiency	
		No of cases	Percentage	No of cases	Percentage
1.	Hereditary	6	30%	8	40%
2.	Alcohol	7	35%	5	25%
3.	Diet	5	25%	6	30%
4.	Gastritis	-	-	1	5%
5.	Pul Tuberculosis	-	-	-	-

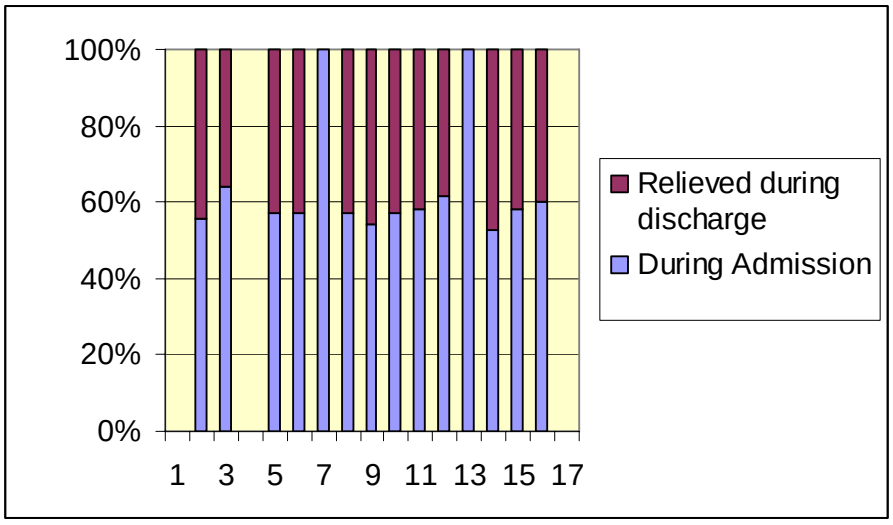


Diabetes Mellitus 30% were Hereditary, 35% were alcoholics 25% were Vegetarian.
In Nutritional deficiency 40% were alcoholics 30% were suffered due to gastritis.

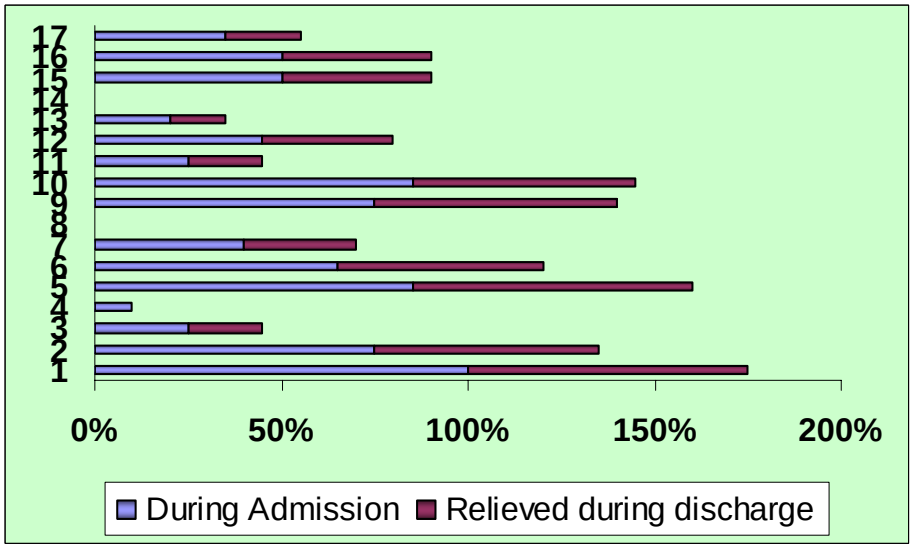
17. SIGNS AND SYMPTOMS

S.No	Signs & Symptoms	Due to Diabetes Mellitus				Due to Nutritional Deficiency			
		During Admission		Relieved During Discharge		During Admission		Relieved During Discharge	
		Number of cases	%	Number	%	Number of cases	%	Number of cases	%
1.	Pallor	-	-	-	-	20	100%	15	75%
2.	Burning sensation felt over soles / legs both	15	75%	12	60%	15	75%	12	60%
3.	Dryness of skin	9	45%	5	25%	5	25%	4	20%
4.	Formication	-	-	--	-	2	10%	--	-
5.	Difficult of walk	20	100%	15	75%	17	85%	15	75%
6.	Heaviness of Body	15	100%	15	75%	13	65%	11	55%
7.	Constipation	13	65%	13	-	8	40%	6	30%
8.	Dryness of Tongue	20	100%	15	75%	-	-	-	-
9.	Pricking sensation	13	65%	11	55%	15	75%	13	65%
10.	Numbness	20	100%	15	75%	17	85%	12	60%
11.	Distal muscle weakness	7	35%	5	25%	5	25%	4	20%
12.	Calf muscle tenderness	8	40%	5	25%	9	45%	7	35%
13.	Reflex-Ankle diminished	3	15%	-	-	4	20%	3	15%
14.	Polyuria, Polydyspsia, Polyphagia	20	100%	18	90%	-	-	-	-
15.	Malaise	11	55%	8	40%	10	50%	8	40%
16.	Palpitation	3	15%	2	10%	10	50%	8	40%
17.	Colicky abdominal pain	-	-	-	-	7	35%	4	20%

RELIEVED DUE TO DIABETES MELLITUS

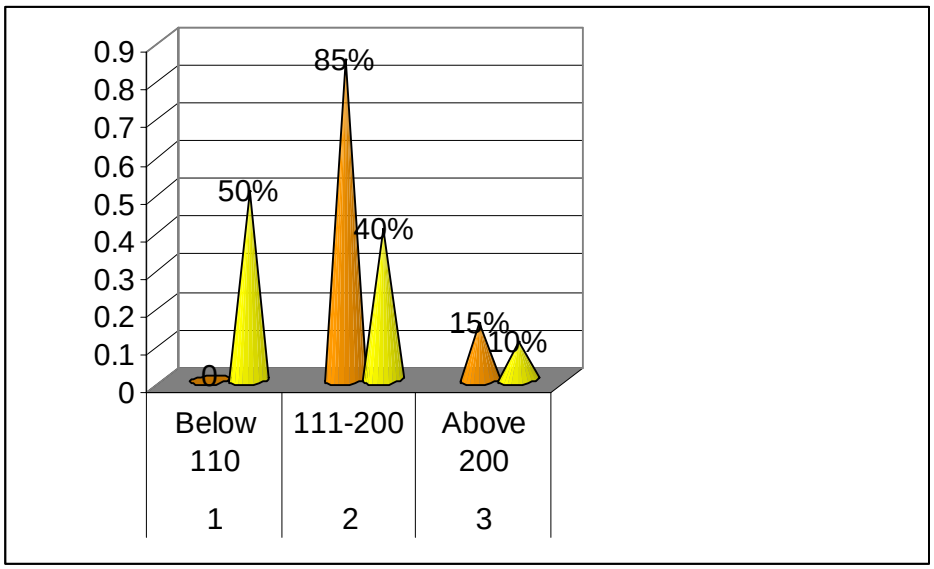


RELIEVED DUE TO NUTRITIONAL DEFICIENCY



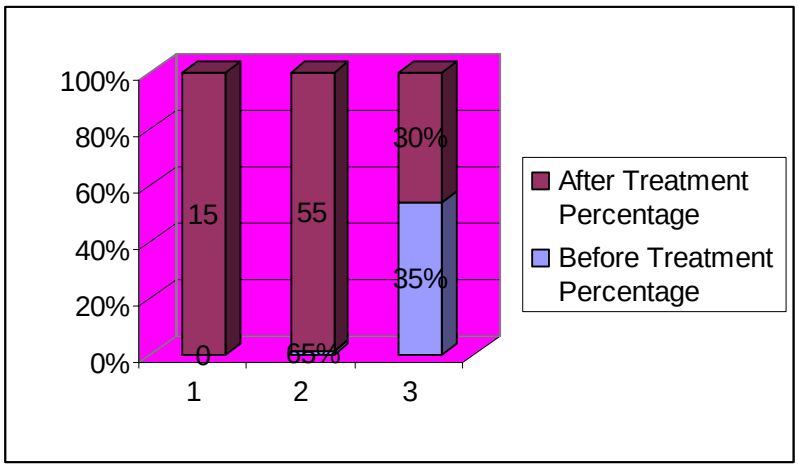
18 (a) ASSESSMENT OF RESULTS

S.No	Blood Sugar Fasting (Mg%)	Before Treatment		After Treatment	
		No of cases	Percentage	No of cases	Percentage
1.	Below 110	0	0	10	50%
2.	111-200	17	85%	8	40%
3.	Above 200	3	15%	2	10%



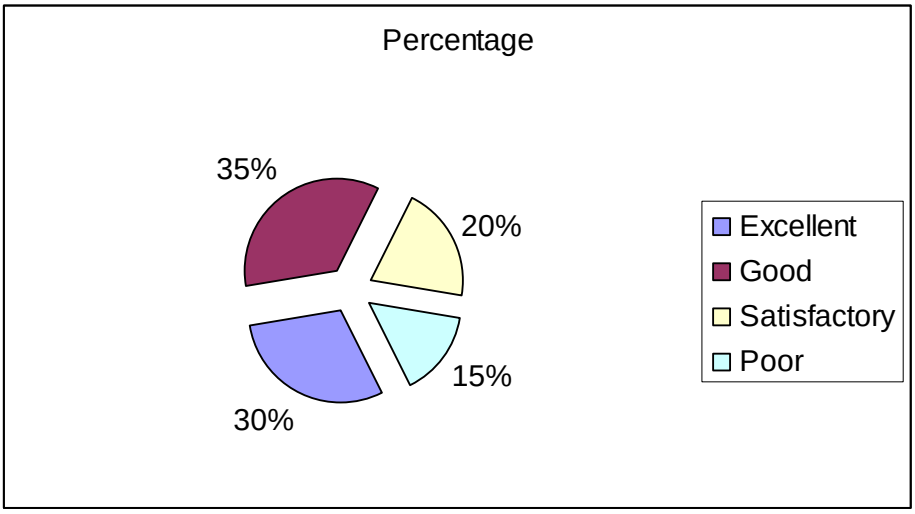
18 (b). BLOOD SUGAR – POST PRANDIAL

S.No	Blood Sugar Post Prandial Mg%)	Before Treatment		After Treatment	
		No of cases	Percentage	No of cases	Percentage
1.	Up to 160	0	0	3	15
2.	161-200	13	65%	11	55
3.	Above 260	7	35%	6	30%



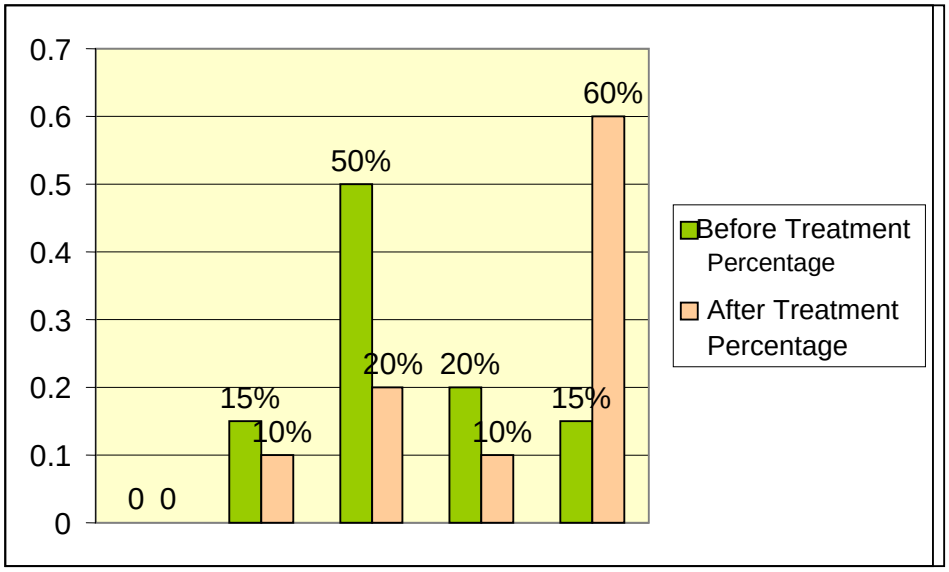
18 (c). IMPROVEMENT OF CASES DUE TO DIABETES MELLITUS

S.No.	Final Result	No. of cases	Percentage
1.	Excellent	6	30 %
2.	Good	7	35 %
3.	Satisfactory	4	20 %
4.	Poor	3	15 %



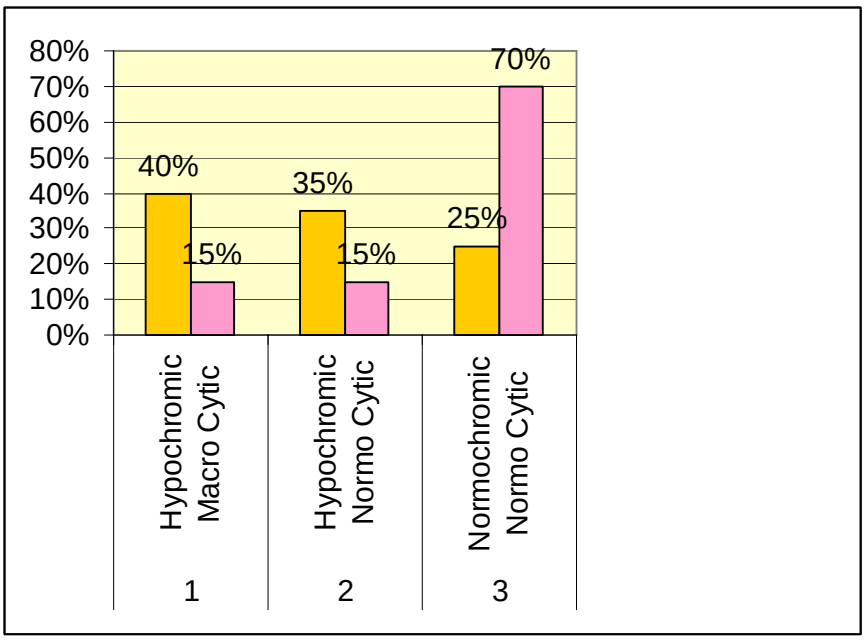
18(d) HAEMOGLOBIN

S.No	Haemoglobin %	Before Treatment		After Treatment	
		No of cases	Percentage	No of cases	Percentage
1.	6 - 7	0	0	0	0
2.	7.1 – 8	3	15%	0	10%
3.	8.1 - 9	10	50%	4	20%
4.	9.1 – 10	4	20%	0	10%
5.	Above 10.1	3	15%	16	60%



18 (e) PERIPHERAL BLOOD SMEAR

S.No	Peripheral Blood Sugar	Before Treatment		After Treatment	
		No of cases	Percentage	No of cases	Percentage
1.	Hypochromic Macro Cytic	8	40%	3	15%
2	Hypochromic Normo Cytic	7	35%	3	15%
3.	Normochromic Normo Cytic	5	25%	14	70 %



Gradation of Results:

All the patients were treated with trial drug for about 30 to 50 days. The improvement were assessed at the end of the trial study.

By Clinical Assessment

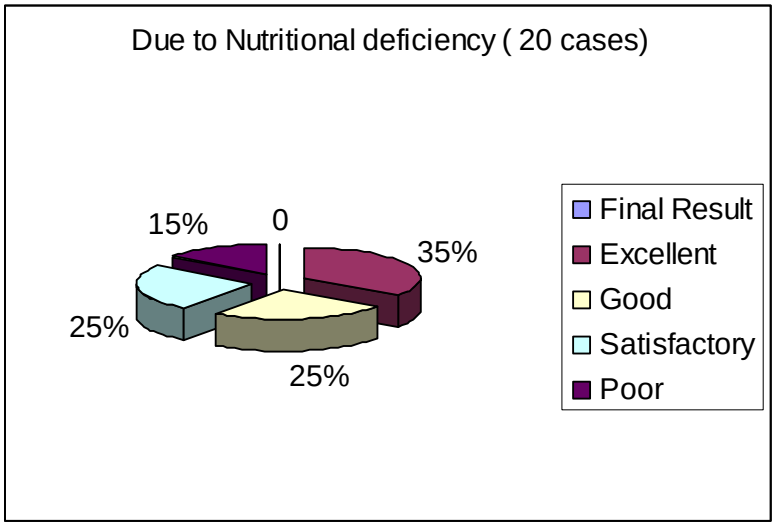
Excellent - Complete disappearance of numbness Heaviness and burning sensation and Associated symptoms.

Good - Complete disappearance of numbness Heaviness and burning sensation

Satisfactory - Complete disappearance of numbness and presence of other major symptoms.

Poor - No remarkable results.

S.No.	Final Result	Due to Nutritional deficiency (20 cases)	
		No. of cases	Percentage
1.	Excellent	7	35 %
2.	Good	5	25 %
3.	Satisfactory	5	25 %
4.	Poor	3	15 %



BIO-STATISTICS

I TREATMENT FOR PERIPHERAL NEURITIS

Hypothesis I : The ratio of total number of patients cured to not cured for peripheral neuritis due to diabetes fall in live with the patients suffering due to nutritional deficiency.

The treatment for peripheral neuritis has been given for two groups of patients, namely suffering from peripheral neuritis due to diabetes mellitus and those who are suffering from peripheral neuritis due to nutritional deficiency. The sampled patients have been tabulated as follows:

Table : Effectiveness of treatment for Peripheral neuritis (ratio analysis)

Patients suffering due to Diabetes Mellitus			**Patients suffering due to Nutritional deficiency**		
Number of patients Cured			**Number of patients not cured**		
15	5	3:1	15	5	3: 1

Incidentally it is true that the sampled patients (40) have been equally from both the categories. It is clear from the table that the ratio of cured and not cured patients suffering from peripheral neuritis due to Diabetes mellitus and Nutritional deficiency remains the same, namely 3:1. This means that the patients suffering from peripheral neuritis have equal chances of getting it due to diabetes as well as nutritional deficiency attesting the first hypothesis of the present study.

Hypothesis II : The Siddha treatment for Peripheral Neuritis has been effective in curing the patients.

The sampled inpatients, namely 40, have been further asked to give their opinion about the treatment they have received in curing their disease. The responses received from the patients have been classified under four categories, namely, (i) Excellent (ii) Good (iii) Satisfactory and (iv) Poor.

For the sake of convenience, the patients who have revealed the same opinion under both the reasons have been combined together and analysis has been undertaken. The observed frequencies expressing the opinion is given in the following table have been estimated. The famous and popular statistical tool, namely, χ^2 (Chi-square) has been employed to verify the second hypothesis.

Opinion about the treatment – Table of observed frequencies (O)

Opinion	Peripheral neuritis due to D.M.	Peripheral neuritis due to N.D.	Total
Excellent	6	7	13
Good	7	5	12
Satisfactory	4	5	09
Poor	3	3	06
Total	20	20	40

Table of Expected frequencies (E)

Opinion	P.N. due to D.M.	P.N. due to N.D.
Excellent	6.5	6.5
Good	6	6
Satisfactory	4.5	4.5
Poor	3	3

Using the observed and expected values, the value of χ^2 has been calculated using the formula.

$$\chi^2 = \frac{\Sigma (0-E)^2}{\Sigma E} = \frac{3}{40} = 0.075$$

The calculated value of χ^2 is 0.975. The table value of χ^2 at 5% significant level and for 3 degrees of freedom is 7.81. **Since the calculated value of χ^2 is less than the table value, the second hypothesis of the present studyholds true. This is means that the Siddha treatment for Peripheral Neuritis has been effective in curing the patients and the second hypothesis is proved.**

DISCUSSION

Vadhakarsanam was described by Yugi in his Yugi Vaidhya Chindhamani is one among the 85 types of Vadha disease. The clinical features of Vadha Karsanam may be related to the clinical features of peripheral polyneuropathy, dealt with Allopathic Medicine.

A total of 40 patients who fulfilled the stipulated criteria were selected. Out of 40 Patient 20 had the astrology of Diabetes Mellitus and 20 has Nutritional deficiency.

All the important investigations to these disease were carried out for all patients and trial drugs were given daily. And proper regular follow up done. Yoga and Thokkanam therapy is also given. Total duration of treatment ranges from 30 – 50 days.

In my study, various factors were taken into consideration for the study are discussed as follows

Gender Wise:

Females & Males were affected equally in both Diabetes Mellitus and Nutritional deficiency.

Age wise :

Among 40 Patients 20 Patients were affected by Diabetes Mellitus in the age group of 46 - 60 years. All of them were Non insulin dependent diabetes patients. In Nutritional deficiency the incidence spread in the age group between 46 – 50 years.

Occupational :

In Diabetic group 30% & 25% of the patients belonged to house wife and sedentary workers. The incidence is due to modernization and invention of electrical & electronical equipments. Both men and women had lack of physical exercise.

In Nutritional group 30% belonged to coolie and 20% house wife. These nature of workers had not take proper diet.

Socio – Economic Status:

During the study of cases 55 % were from lower income group 45 % of middle income group in Diabetes mellitus. In nutritional case 65% were lower income group.

Dietary Factor:

In Diabetic group the incidence was more among mixed diet category. In Nutritional deficiency group 55% were mixed diet category and 45 % were strict vegetarians. The strict vegetarians may lack in getting B_{12} Vitamin.

Personal Habits:

In diabetic group 35% of cases were Alcoholics. In Nutritional group 30% were chronic alcoholics.

Alcohol plays an important role in this disease. Thiamine deficiency occurs particularly in chronic alcoholics. It also displaces regular diet.

Kaalam:

All patients were in Pitha Kaalam [34 – 66 Yrs]

Seasonal:

The disease was more in Munpani and Kaarkaalam

During these seasons Vadham is said to be increased and aggravate the symptoms

Thinai:

Most of the case in my study came from Neithal land i.e. more of Chennai based patients. The Siddha literature reveals that this land is a place for aggravation of Vadha.

Very minimum cases were from Marutha Nilam. Though marutha Nilam is a land of free from disease, environmental factors and personal habits leads to occurrence of disease.

Duration of Illness :

Due to Diabetes of 35% of cases had less than 3-5 month duration 25% had 2-4 months duration. In Nutritional deficiency 30% had less than 0 – 1 months Duration.

The drugs responded very well for 2 -4 months duration.

Mukkutram

Disturbances in Vadham :

- Pranan was affected in 35% [Nut Def] It which was presented by dyspnoea on exertion, cough with expectoration.
- Abanan was affected in 100% [D.M] as polyuria and constipation; 30% (Nut. Def) as constipation.
- Viyanan was affected in 100% [DM & Nut De] It was denoted by Numbness, pricking sensation, pain and pallor.
- Samanan was affected in 100% [DM] as increased appetite ;and in [Nut Defi] as loss of appetite and epigastric pain.
- Uthanan was affected in 20% as [Nut, Def] nausea, vomiting and headache.
- Koorman was affected in 25% in (DM) This was denoted by disturbances in vision.
- Kirukaran was affected in 100% (DM) as increased appetite, dryness of the tongue. Loss of appetite, cough

- Devathathan was affected in 55%. (DM) and 40% (Nut Def) It was denoted as malaise, disturbances in sleep.

Disturbances in Pitham :

- Anarpitham was affected in 100% [DM] as increased appetite; and 65% in [Nut def] as loss of appetite.
- Ranjaga pitham was affected in 60% [Nut def] presented as pallor.
- Prasagam was affected in 55% (DM) and 35% (Nut Def) presented as dry skin.
- Alosagam was affected in 20% (DM); and 15% (Nut Def) as disturbances in vision.
- Sathagam was affected in 60% [DM] and 45% [Nut Def] as malaise.

Disturbances of Kapham:

- Avalambhagam was affected in 30% (Nut Def) denoted as dyspnoea on exertion, cough.
- Kilethagam was affected in 100% [DM] as increased appetite; 65% (Nut Def) as loss of appetite.
- Pothagam was affected in 20% (Nut Def) as diminished taste sensation.
- Tharpagam was affected in 20% (DM) 30% (Nut Def) as burning sensation over eyes.
- Santhigam was affected in 25% (DM) 10% (Nut Def) as pain in knee joint.

Udal Kattugal

- Saaram, Seneer, Oon were affected in 100% [both DM & Nut def] in their diminished state.
- Affected saaram makes the patient emaciated, loss of interest in general activity & dryness of the skin.

- Affected seeneer makes nervousness, dryness and diminution of the colour of the skin.
- Affected oon causes disturbance in sensory organs, distal muscle weakness pain in knee joint.
- Kozhuppu was affected in 25% [DM] 15% [Nut Def] and causes crepitations in knee joint.
- Enbu was affected in 25% [DM] 15% [Nut Def] Its diminished state cause pain in the knee joint.

Envagai Thervugal :

- Naadi : Pitha Vadham 50 % in DM and 45% in Nut Def
  Vadhapitham in 45% in DM and 20% in Nut Def
  Kapha Vadham in 5% in DM and 35% in Nut Def

- Sparisam was affected in 75% (DM) and 50% (Nut Def) was reflected as dryness of the skin.
- Naa was affected in 100% [DM]; as dry tongue and in 75% [Nut defi] as pale smooth tongue and diminished taste sensation.
- Niram was affected in 75 % [Nut Def] which was denoted as pallor conjunctiva paleness to their normal skin colour.
- Mozhi was affected in 15% [Nut Def] as disarthria.
- Vizhi was affected in 60% [DM] and 75% [Nut Def] It was denoted as diminished vision and pallor conjunctiva
- Malam was affected in 65% [DM] and 40% [Nut Def] It was denoted as constipation, occasionally, presence of ascaris ova.
- Moothiram was affected in 100% [DM] as polyuria.

Neikuri

Vadha Neer in 55 % (DM) and 55% (Nut Def)

Pitha Neer in 35% (DM) and 45% (Nut Def)

Kapha Neer in 20% (DM)

Predisposing Factors And Associated Disease

Hereditary :

30% of Cases of DM had positive family history for the same diseases.

Alcohol :

DM; [35%] were chronic alcoholics. This leads to vitamin deficiency particularly thiamine. It also displaces regular diet.

Vegetarian Diet :

25% [DM] 25% [Nut Def] were strict vegetarian. These patients may had B_{12} deficiency.

Gastritis :

30% of cases in Nutritional deficiency. This leads to B_{12} malabsorption or due to lack of intrinsic factor.

Pulmonary Tuberculosis :

10% of cases in Nutritional deficiency. Patients treated with the Anti – tuberculin drugs produce anemia.

SIGNS & SYMPTOMS

Of the patients suffered with Numbness felt over 75% in (DM) and 85% (Nut Def)

- Pallor
- Dryness of the skin 45%[DM] 25% [Nut Def]
- Difficult to walk in 100%[DM] 85% [Nut Def]
- Dryness of the tongue 100% [DM]
- Heariness of the body in 100% [DM]
- Burning sensation felt over soles in 75% (DM) 75% in (Nut Def)

Associated Symptoms like

- Constipation in 65%[DM] 40% [Nut Def]
- Distal muscle weakness in 35% [DM]
- Symptoms like constipation, heaivness of the body were relieved within 2 weeks during treatment.
- Burning sensation, numbness, and 80% of symptom relieved within 3 to 4 weeks
- There is improvement in all symptoms clinically and their condition was good.

Laboratory Investigation :

- Routine investigation of Blood, Urine & stools were done at the time of admission and discharge.
- At the time of discharge, Urine Sugar & Blood Sugar level were decreased in most of the Diabetes Mellitus cases and Peripheral blood smear [Nut Defi]
- During admission 40% had hypo chromic macrocytic and it decreased to 15% during discharge.
- 35% had hypo chromic Normocytic at the time of admission and it reduced 15% to during discharge.
- 25 % had Normochromic Normocytic Normal appearance at the time of admission. Finally all were improved during discharge.

MANAGEMENT:

Every patient had advised to take 10 gms of Nilavagai Choornam with hot water at bed time prior to the treatment. From the second day trial drugs were given to the patient.

I. Kukilathy choornam – 1 – 2 gm t.d.s. with hot water after food.

II. Vetiver thylum – 30 ml [External Use for application or for bathing weekly once]

Diabetic patients are advised to take food as in diabetic chart. They were advised to do yogasanas such as salabasanam, Dhanurasanam Pachimothasanam and to go for walk at least 2km / day.

Nutritional deficiency patients were advised to take whole grains, unmilled rice, cereals, nuts, green leafy vegetables, dates, peas, bananas, soya milk, Carrot juice etc.,

All the patients were adviced to go to thokkanam therapy.

Biochemical Results:

The results of bio chemical studies reveal that kukilathy choornam contains. Sulphate, Chloride, oxalate, ferrous iron, Starch, alkaloid, unsaturated Compound.

The Microbiological study reveals that the drug is not sensitive to staphylococcus aureus, Escherichia coli, Klebsiella, Proteus, Pseudomonas and Candida Albicans.

In mukkutra verupadugal derangement of vadham leads to Vadha Karsanam.

The trial drug has Thuvarppu suvai.

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fh£LŠ ritbašyh«
rhu« gçfhuŠ rh‰W

- f©Qrhäa«

As the drug as Thuvarppu Suvai it aggravates Vatham but acts as Ethirurai medicine. The drug shows no side effect and adverse effects

Assessment of results :

Patients with Diabetes

30 % had excellent result : 25% had good result : 20% had satisfactory result : 15% had poor result.

Patient with Nutritional deficiency :

35 % had excellent result; 25% had good and satisfactory result, 15% had poor result.

Vadha Karsanam due to Diabetes had responded well during treatment, the symptoms relieved earlier when compared to patients with Nutritional deficiencies.

SUMMARY

Vadha Karsanam is studied with the comparison of both siddha and Allopathic view. The drugs are

I. Kukilathy Choornam 1 – 2 gm t.d.s. with hot water

II Vetiver Thailum [30 ml] External Use.

In the study of Vadha karsanam the main symptoms are taken into consideration. Among them 20 patients had Diabetes Mellitus and 20 patients had Nutritional deficiency.

The trial drugs is given to all the selected patients. From the observation and results the diseases was common in the following aspects.

- The prevalence of disease was high among lower economic group.
- Most of male patients were chronic alcoholic consumer.
- The incidence is more in neithal land.
- The Uyirthathus dearranged in maximum cases were

  Vali - Pranan, Abanan, Viyanan, Samanan, Kirukaran

  Azhal - Analagam, Ranjagam, Sathagam, Prasagam

  Iyam - Avalambagam, Kilethagam
- In Udalkattugal Saaram, Seneer, Oon was affected.
- Siddha diagnosis were achieved with the help of envagai thervugal. It was found that sparisam, Naa, Niram, Vizhi, Malam, Moothiram were affected.
- Naadi was predominantly pitha vadham and vadha pitham.

Laboratory investigation which include routine blood, urine, stool and peripheral blood smear were done during admission and discharge. Biochemical and Microbiological analysis were done.

The efficacy of the trial drugs were studied and observed during my trial study period. Most of the patients had shown significant reduction of symptoms and clinically no side effect, adverse effect and complications are noted. Very few patients had discontinued the inpatient session and continued in the out patient department. .

CONCLUSION

Vadha Karsanam is a vadha disorder of the society increasing incidence day by day. The disease mainly affect the Peripheral Nervous system.

The result of the study was

Excellent in 30% (D.M) and 35% (NUT.DEF)

Good in 35% (D.M) and 25% (NUT.DEF)

Satisfactory in 20% (D.M) and 25% (NUT DEF)

Poor – 15% in both (D.M) and (NUT DEF)

The results obtained from the clinical study were very much encouraging. Elevated values of blood sugar were decreased and hemoglobin was increased.

In patients with Diabetes Mellitis no hypoglycemic complication were observed during the study. Therefore it can administered for a long period.

The drug is subjected to biochemical analysis to ensure the safety. The preparation of the trial drugs are simple and dosage is also ……..

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